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# FURUNO

# OPERATOR'S MANUAL

## FACSIMILE RECEIVER

MODEL FAX-210

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NISHINOMIYA, JAPAN

© FURUNO ELECTRIC CO., LTD.

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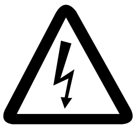
# ⚠ SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator and installer of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

| | |
|---|---|
| ⚠ **DANGER** | This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. |
| ⚠ **WARNING** | This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ⚠ **CAUTION** | This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage. |

# ⚠ SAFETY INFORMATION FOR THE OPERATOR

## ⚠ WARNING



**Avoid opening cover of equipment except to replace paper, fuse or printing head.**

This equipment uses high voltage electricity which can shock.

**Do not dissasemble or modify the equipment.**

Fire, electrical shock or serious injury can result.

**Immediately turn off the power at the ship's mains switchboard if water or foreign object falls into the equipment or the equipment is emitting smoke or fire.**

Continued use of the equipment can cause fire, electrical shock or serious injury.

## ⚠ CAUTION

**Do not place liquid-filled containers on the top of the equipment.**

Fire or electrical shock can result if a liquid spills into the equipment.

**Do not place heater near the equipment.**

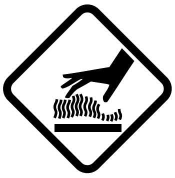
Heat can melt the power cord, which can result in fire or electrical shock.

**Do not operate the unit with wet hands.**

Electrical shock can result.

**Use the correct fuse.**

Use of the wrong fuse can cause fire or equipment damage.



**Do not touch printing head just after printing.**

Burn can result.

### WARNING Label attached

**⚠ WARNING ⚠**

**To avoid electrical shock, do not remove cover. No user-serviceable parts inside.**

⚠ ▬ ▬ ⚠

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Name: Warning Label (1)
Type: 86-003-1011-0
Code No. : 100-236-230

# SAFETY INFORMATION FOR THE INSTALLER

## WARNING

**Only qualified personnel should work inside the equipment.**

This equipment uses high voltage electricity which can shock, burn, or cause death.

**Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switchboard to ensure that the power will not be applied while the equipment is being installed.**

Serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.

## CAUTION

**Ground the equipment to prevent electrical shock and mutual interference.**

Ungrounded equipment can give off or receive electro-magnetic interference or cause electrical schock.

**Confirm that the power supply voltage is compatible with the voltage rating of the equipment.**

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the equipment.

# FOREWORD

Congratulations on your choice of the FURUNO FAX-210 Facsimile Receiver. We are confident that you will enjoy many years of operation with this fine piece of equipment.

For over 40 years Furuno Electric Company has enjoyed an enviable reputation for quality and reliability throughout the world. This dedication to excellence is furthered by our extensive global network of agents and dealers.

The FAX-210 is just one of the many Furuno developments in the field of marine radio equipment. Furuno is the first manufacturer to offer a single stylus facsimile receiver, models FAX-108/143II.

This unit is designed and constructed to ensure the user of many years of trouble-free operation. To obtain full performance from the equipment, however, you should carefully read and follow the recommended procedures for installation, operation and maintenance. No machine can perform its intended function unless it is installed and maintained properly.

Thank you for considering and purchasing Furuno equipment.

# FEATURES

The FAX-210 Facsimile Receiver has a wide variety of functions, all contained in a rugged metal case that is compact to fit almost any class of vessel.

All keys respond immediately to the operator's command and each time a control key is pressed an audible "beep" sounds to confirm that the command has been accepted by the unit.

Some of its prominent features are as follows.

- Parallel thermal head recording enables very quiet operation. Odors, fumes, carbon dust, electric noise, etc. are eliminated.
- Thermal paper provides a clear-cut, high-quality picture in eight tones. Cloud analysis picture in the FM mode is presented clearly.
- Programmed with all existing facsimile stations and frequencies, which may be updated by the user. 310 private frequency spaces are reserved additionally for the user.
- Fully automatic reception by the built-in on/off/sleep schedule timer, auto speed/IOC selection, auto phase alignment and intelligent optimum frequency selection facility.
- Menu-driven/dialogue-guided operation enables sophisticated function with simple key sequences ... the highest user-friendliness.
- Battery back-up for real-time clock, schedule, channel/frequencies and all user presets.
- Various self-tests available for easy service and maintenance.
- Optional preamp unit available for vessels with limited antenna mounting space, providing stable signal on LF and HF bands with minimum onboard noise.
- Automatic reception of priority NAVTEX messages, even when a facsimile recording is being received.

# TABLE OF CONTENTS

# SPECIFICATIONS

The FAX-210 Facsimile Recorder prints facsimile recordings in 8 tones on 10-inch recording paper. A built-in timer allows unattended operation. With the optional NAVTEX kit, NAVTEX signals can be received, in addition to facsimile signals.

## RECORDER SECTION

| | |
|---|---|
| Recording System: | 16-dot serial thermal recording system |
| Scanning Speed: | 60, 90, 120 and 240 on full scale |
| Index of Cooperation: (I.O.C.) | 576 (fine) and 288 (rough) |
| Line Density: | 5 lines/mm approx. |
| Gradation: | Eight levels |
| Recording Controls: | a. Start/stop<br>Automatic by schedule timer and/or<br>WMO remote control signals, or Manual<br>(schedule timer - 16 programs/day)<br>b. Scanning speed<br>Automatic or Manual<br>c. I.O.C.<br>Automatic by WMO start signals or Manual<br>d. Phase matching<br>Automatic by line sync. signal or Manual |
| External Input Signal: | Black 1500Hz, white 2300Hz FSK or FM signal<br>(signal level; 0 dBm at 600 ohms) |
| Recording Paper: | Thermal paper TP-1030A, 280mm(W)x30m(L)<br>effective width 264mm |

## RECEIVER SECTION

| | |
|---|---|
| Frequency Range: | LF 80kHz to 160kHz and<br>MF/HF 2MHz to 25MHz both in 100Hz steps |
| Number of Channels: | All existing facsimile stations and frequencies plus 310 private frequencies (both re-programmable by operator) |

| | |
|---|---|
| Frequency Selection: | o Automatic channel search for highest signal strength within a selected zone/station<br>o Manual selection of zone, station and channel number<br>o Manual tuning by frequency up/down keys |
| Tuning Indication: | Flow-up/flow-down (detuned) and steady (tuned) by three LEDs |
| Class of Emission: | F3C, J3C (USB/LSB selectable) |
| Receiving Sensitivity: | LF: better than 10uV at 20dB SINAD<br>MF/HF: better than 2uV at 20dB SINAD |
| Selectivity: | 2.6kHz at -6dB<br>8kHz at -60dB |

## GENERAL SPECIFICATIONS

| | |
|---|---|
| Power Supply: | 10 to 40Vdc universal or<br>85-132VAC/170-264VAC (wiring), 1 ϕ, 50/60 Hz |
| Power Consumption: | DC set, Stand-by: less than 15W<br>Recording: less than 40W<br>AC set, Stand-by: less than 25VA<br>Recording: less than 60VA |
| Environmental Condition: | -15℃ to +55 ℃ (95%RH at 35℃ ) |

## NAVTEX RECEIVER SECTION (Option)

| | |
|---|---|
| Receiving Frequency: | 518kHz |
| Station and Message Selection: | On/off selection of station and message by keypad |
| Message Memory Capacity: | 7000 characters (8k byte)<br>30 identification codes |
| Message Holding Time: | 66 hours after reception |
| Alarm Indication: | Audible and visible (LED) indications for SAR message reception |

| | |
|---|---|
| Minimum Antenna Input: (for message capture) | Less than 2uV for 50 ohm antenna or less than 5uV for 150pF + 10 Ω reactive antenna |
| Interference Rejection: | Error rate less than 4% with desired signal of 20dBu and interference signal of 14dBu |
| Intermodulation: | Better than 70dB for 4% error with desired signal of 20dBu |
| Spurious Emission: | Less than 1nW |
| Number of Columns: | 79 characters/line |
| Character Construction: | 13 x 9 dot matrix |
| Character Set: | Letters, numbers and symbols |
| Print Speed: | 27 characters/second |
| Applicable Standards and Regulations: | Complies with; CCIR rec. 476-3, CCIR rec. 540, CEPT, MTP 1240B |

## LF/HF PREAMP UNIT (FAX-5: Option)

| | |
|---|---|
| Frequency Range: | 80kHz to 30MHz |
| Applicable Antenna: | Wire antenna or 2.6m Whip antenna |
| 3rd Order Output Intercept: | +23dBm |
| Input Protection: | Protected against 30Vrms antenna input for 15 minutes |
| Output Impedance: | 50 ohms |

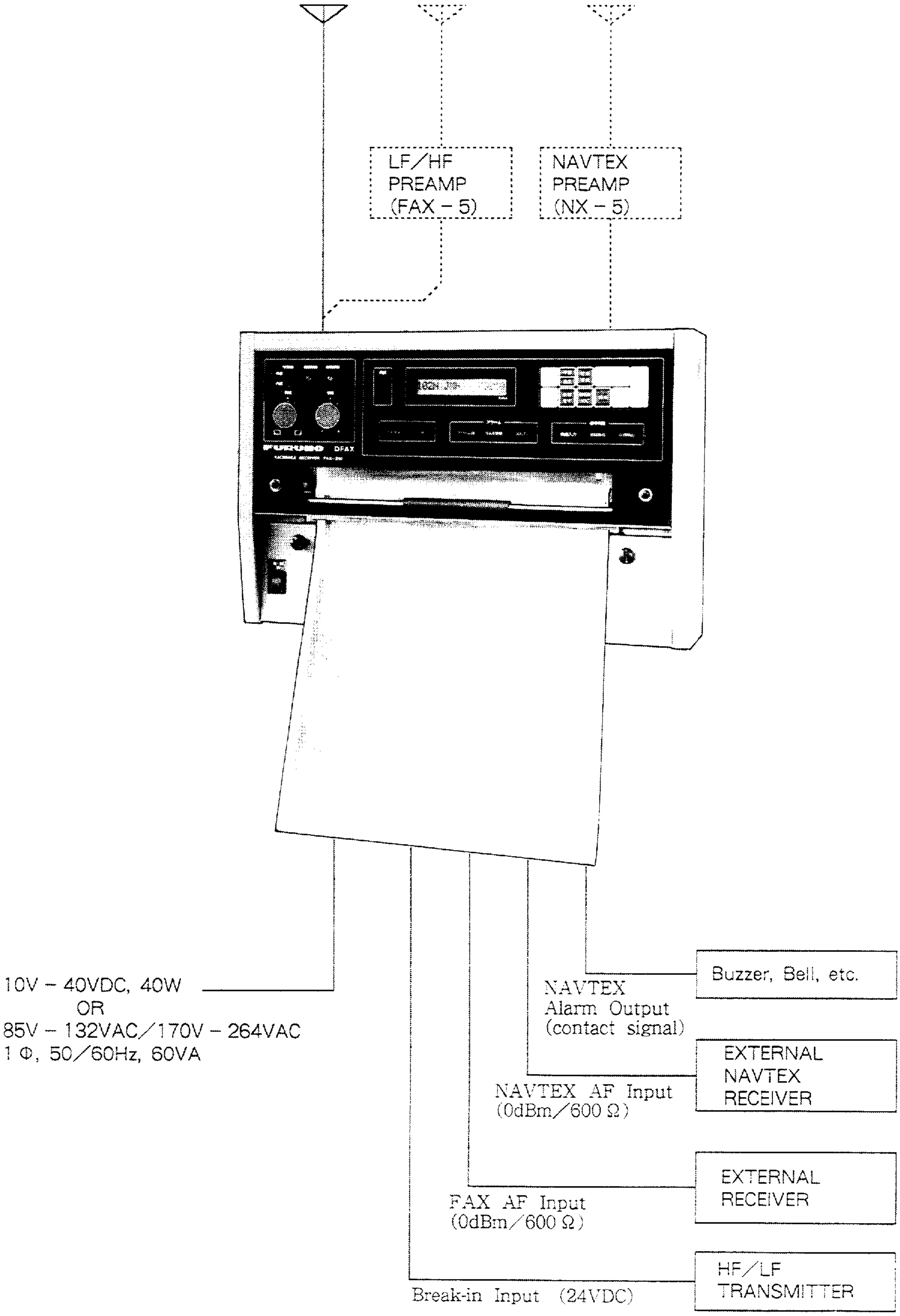
## NAVTEX PREAMP UNIT (NX-5: Option)

| | |
|---|---|
| Tuned Frequency: | 518kHz |
| Applicable Antenna: | Wire antenna or 1.2m Whip antenna |
| Input Protection: | Protected against 30Vrms antenna input for 15 minutes |
| Output Impedance: | 50 ohms |

# COMPLETE SET

| No | NAME | TYPE | MASS | Q'TY | REMARKS | |
|---|---|---|---|---|---|---|
| 1 | Main Unit | FAX-210 | 12 | 1 | | |
| 2 | Accessories | FP08-00600 | | 1 set | | |
| 3 | Installation Materials | CP08-01100 | | 1 set | For ac mains | Either one is supplied. |
| | | CP08-01110 | | | For dc mains | |
| 4 | Spare Parts | SP08-01100 | | 1 set | For ac mains | Either one is supplied. |
| | | SP08-01110 | | | For dc mains | |
| 5 | LF/HF Preamp Unit | FAX-5 | 0.6 | (1) | With 15 m cable (option) | |
| | | | | | With 1 m cable (option) | |
| 6 | Whip Antenna | 04S4176-0 | 0.5 | (1) | 2.6 m (option) | |
| 7 | Extension Cable Kit | OP04-2 | | (1) | 10m,20m,30m,40m or 50m (option) | |
| 8 | NAVTEX Board | 08P3119 | | (1) | (option) | |
| 9 | NAVTEX Preamp Unit | NX-5 | 0.6 | (1) | With 15 m cable (option) | |
| 10 | Whip Antenna | FAW-6R2 | 3 | 1 | 6 m (option) | |
| 11 | Whip Antenna | FAW-1.2 | | 1 | 1.2 m (option) | |
| 12 | Receiving Antenna Junction Box | AJB1-1A | 4 | 1 | (option) | |
| 13 | Clamp | OP08-11 | | 1 | (option) | |

# SYSTEM CONFIGURATION



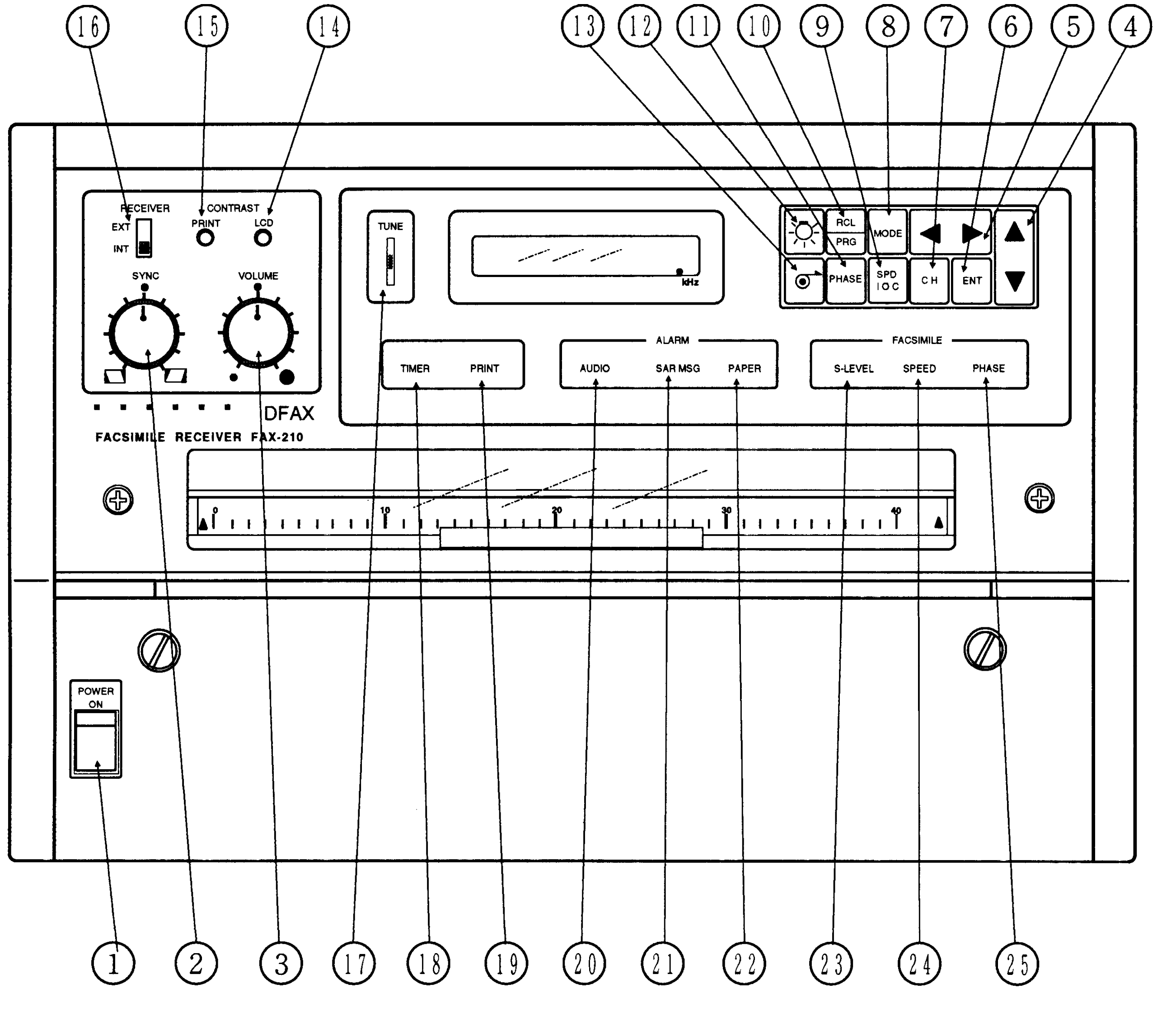
# CHAPTER 1 OPERATION

## OPERATIONAL OVERVIEW

The FAX-210 is a rather simple unit to operate, although at first glance it may be a little intimidating to someone who has never used a facsimile receiver before. However once you get to know what the various abbreviations mean, the simplicity and the logic behind the panel layout will become more apparent.

The front panel is divided roughly into two blocks; keys, delineated by different color schemes, the LCD display composed of 16 characters on the upper side, and the printer on the lower side. Just below the keys and the LCD display are various annunciator LEDs which light when the paper is out, the signal is too weak, etc. Each time a key pressed an audible beep is generated to signal the operator that the unit has received his command.

Front panel layout and a brief explanation of the function of each control and LED are given on the next page.




# FAX-210 FRONT PANEL CONTROL & LED

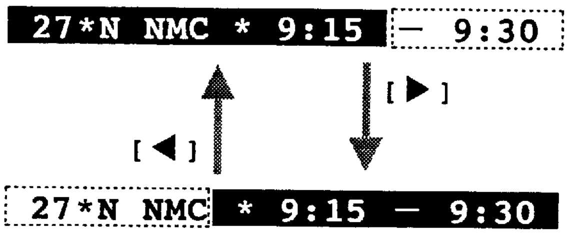
| No. | CONTROLS AND KEYS | |
|---|---|---|
| ① | POWER ON | Turns on and off the unit. |
| ② | SYNC | Equalizes picture synchronization to align with the paper feed direction. |
| ③ | VOLUME | Adjusts audio level of the monitor speaker. |
| ④ | ▲ ▼ | Used to scroll a number or message upward or downward. |
| ⑤ | ◀ ▶ | Used to move the cursor or data sideways. |
| ⑥ | ENT | Used to enter data or activate a function. |
| ⑦ | CH | Used to call up station and frequency data. |
| ⑧ | MODE | Used to control operation of printer. |
| ⑨ | SPD IOC | Selects speed and IOC numbers. |
| ⑩ | RCL PRG | Used to recall data stored in the memory, or used to program data. |
| ⑪ | PHASE | Adjusts picture phase. |
| ⑫ | -☼- | Used to adjust brightness of LCD backlighting and LED indicatord. |
| ⑬ | ⊙ | Used to feed paper. |
| ⑭ | LCD | Adjusts contrast of the LCD display. |
| ⑮ | PRINT | Adjusts darkness of recording. |
| ⑯ | RECEIVER EXT INT | Selectd internal or external receiver. |

| No. | ANNOUNCIATOR LEDs | |
|---|---|---|
| ⑰ | TUNE | The top, middle or bottom LED lights when Rx freq. is higher, the same, or lower than programmed freq., respectively. |
| ⑱ | TIMER | Lights when operating on timer mode. |
| ⑲ | PRINT | Lights while the picture is being printed. |
| ⑳ | AUDIO | Lights when the alarm buzzer for SAR reception is disabled. (Audio Alarm **OFF**) |
| ㉑ | SAR MSG | Lights when received the Search And Rescue message of NAVTEX signal. |
| ㉒ | PAPER | Lights when the recording paper runs out completely. |
| ㉓ | S-LEVEL | Lights when the signal is too weak to receive. |
| ㉔ | SPEED | Lights when the scanning speed is incorrectly set. |
| ㉕ | PHASE | Lights when picture is out of phase. |

# OPERATING CONTROLS

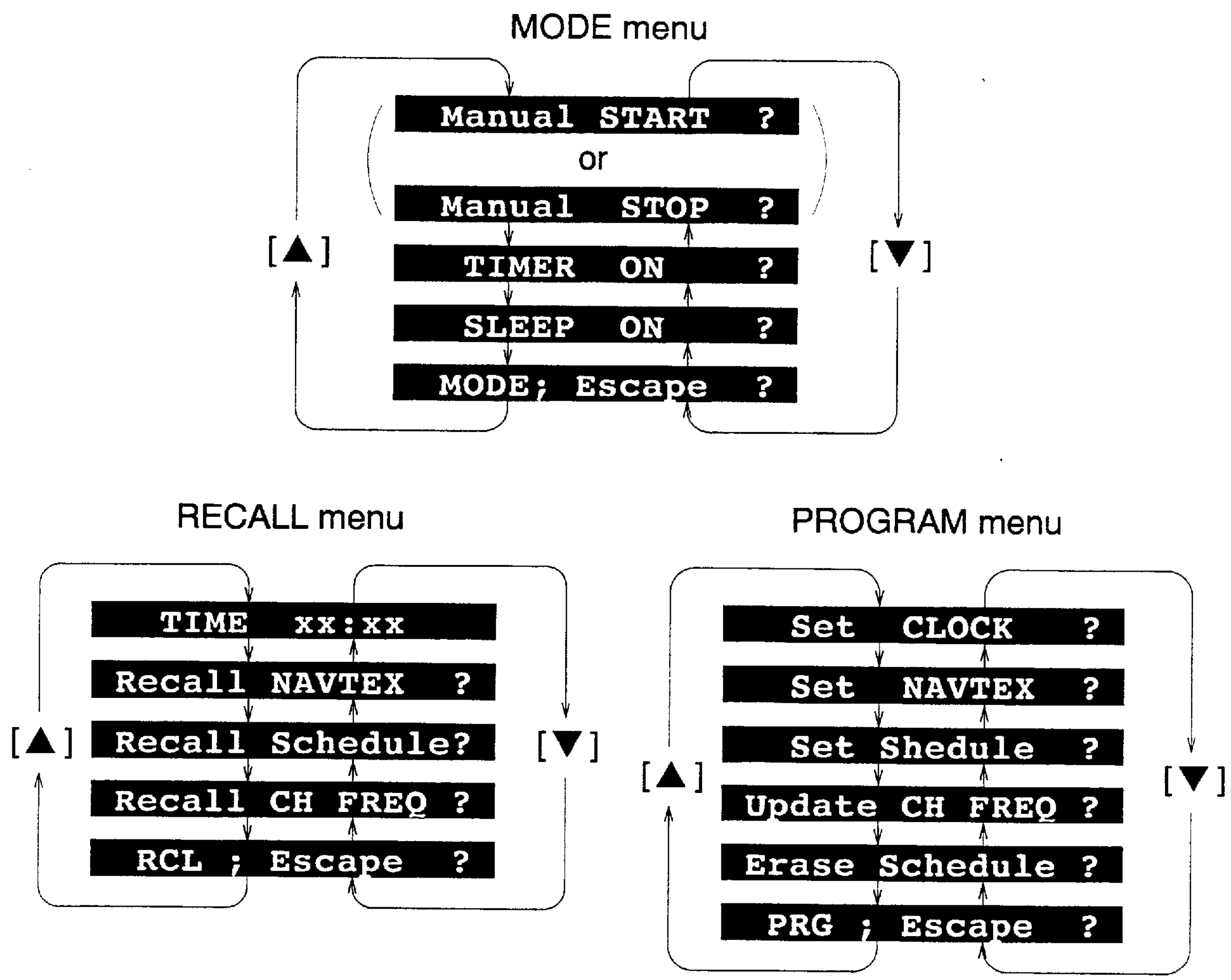
## ARROW KEYS

You may notice that there are no numeric keys on the panel, unlike other equipment which employ numeric keys to enter data. It means that entry of the numeric data or selection of the operating mode is performed by scrolling the number or message displayed on the LCD window. The vertical arrow keys [ ▲ ] and [ ▼ ] are used to scroll the menu upward or downward, respectively. On the contrary the horizontal arrow keys [ ◀ ] and [ ▶ ] are for moving the cursor for data entry (or recall) leftward or rightward. In some modes, however, these keys are also used to scroll the display sideways. Pressing the [ ▶ ] key when the cursor is located at the right end of the LCD display will scroll the window rightward. Similarly when the cursor is at the far left end, the [ ◀ ] key will scroll the window leftward. The figure below shows an example of sideway scrolling in the program timer mode.




## FUNCTION KEYS

The [MODE] and the [RCL/PRG] keys deal with several operating modes. The [MODE] key is used to turn on/off the printer in the manual recording mode, or to activate the timer/sleep modes. The [RCL/PRG] key stands for RECALL/PROGRAM, and is used to display or update the current time data, frequency data, timer program, NAVTEX station and message data (optional NAVTEX board required), etc. The first pressing of the [RCL/PRG] key selects the Recall function, then pressing the same key again will call up the Program function. When you press the [RCL/PRG] key once, the function "Time" is selected first since it is a default setting. Other functions may be selected by scrolling the display with the [ ▲ ] or [ ▼ ] key as shown on page 1-4. To activate the function selected, press the [ENT] key. If you accidentally type in the [MODE] or [RCL/PRG] key, select the "Escape?" message of each menu and hit the [ENT] key to restore the unit to the normal operation.




Ex. To select the function "Set Schedule?" in the program mode, the keystrokes required are as follows.

Press the [RCL/PRG] key twice, then press either the [ ▲ ] or [ ▼ ] key until the message "Set Schedule?" appears on the LCD display. Note that you may also access this function by using different keystrokes; press the [RCL/PRG] key once and scroll the display with the vertical arrow keys to obtain "Recall Schedule?". Again pressing the [RCL/PRG] key will call up the message "Set Schedule?" on the display.

Note that if you select a desired function in the recall mode, pressing the [RCL/PRG] key again will call up the same function in the program mode.

## OTHER KEYS

The symbols or abbreviations printed on the [ ⊚ ], [ ☼ ], [PHASE], [SPD/IOC] and [CH] keys directly represent their functions. For instance, the [ ⊚ ] key is used to feed the paper and the [ ☼ ] key is for varying the backlighting of the LCD display. The name and function of each control and key (including annunciator LEDs) are recapitulated on page 1 - 2.

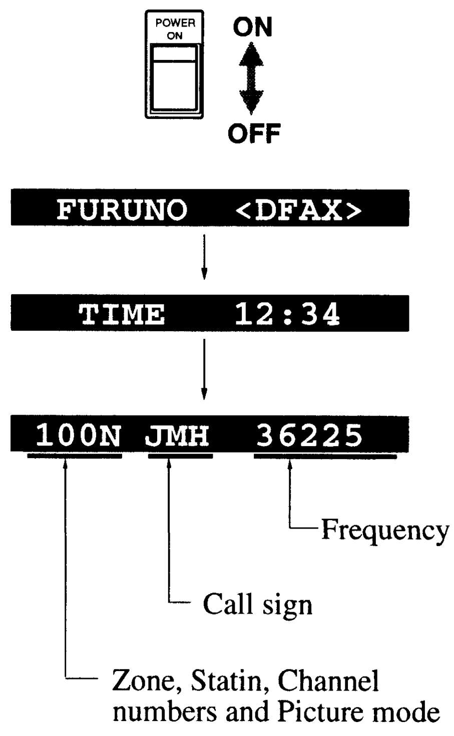
# MANUAL RECORDING

As is described in the FEATURES section, the FAX-210 employs a unique timer which enables automatic recording of facsimile signals up to 16 programs according to a preset schedule. In most cases this may be the only operating mode you will use. However, should you desire to record a program already in progress, or if the transmitting station does not use start and stop signals, you will have to receive the program manually. In this section the basic operating procedure for manual recording is explained step by step. The operating procedure for Timer Recording is explained later on.

Before you do start operation, obtain a radio facsimile frequency list for your area. The Facsimile Station List attached to the appendix of this manual (B-1 through B-3) may be useful to quickly find out the call sign and frequency in your area, since it is arranged in alphabetical order according to country. Make sure that the recording paper is properly loaded, referring to page 1-24.

## POWER ON/OFF

Power on/off of the unit is made using the POWER switch located on the lower left of the front panel. Press the POWER switch upward and you will see the time displayed on the window for several seconds. Then, the display will change to channel data: zone, station and channel numbers plus picture mode (refer to page 1-14 for details of the picture mode), followed by a call sign and frequency in this order. When a specific function is completed by the action of keystrokes, the unit returns to the normal display, indicating the channel data previously selected.



**[ Normal Display ]**

The very first time you turn on your unit, don't worry about the stray data displayed on the window (the time may be inconsistent with the local time in your area and the call sign may be unknown to you), since these were factory-set.

To turn off the power press the POWER switch downward.

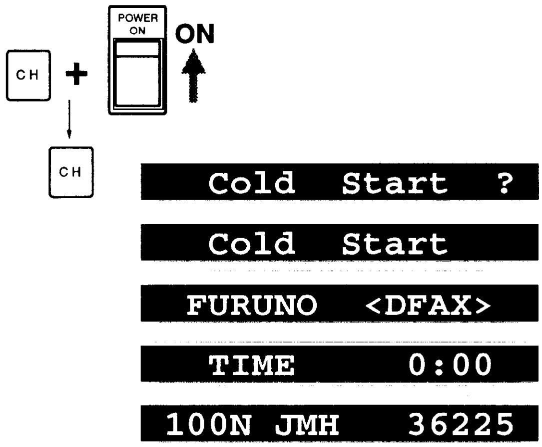
**CAUTION**

*Never turn off the power during recording. The printing head remains in contact with the recording paper (roller), applying harmful pressure to the printing head.*

### Initialization of the unit (Cold Start)

The FAX-210 is designed to retain in memory all information entered by the user (such as time, programmed schedules, etc.) whether it is turned on or off. An internal "Keep-alive" battery, of which the estimated life is five years, performs this function. However, data in the memory may become jumbled due to a dead battery or accidental loosening of the plugs connecting the pc boards. In either case, you have to clear the memory to ensure that no erratic data is stored there. Upon clearing the memory, the unit is reset to the following default state.

In order to initialize the unit, turn off the unit first, then hold down the [CH] key while turning on the POWER switch. The message "Cold Start?" will appear on the display. Hit the [ENT] key and the message will change to "TIME 0:00," notifying the operator that the unit is now initialized. Note that the channel and frequency data preprogrammed at the factory can not be erased, since these are exclusively stored in the ROM (non-volatile memory).



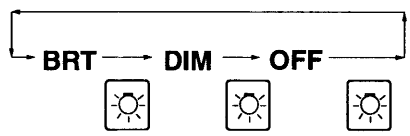

## ADJUSTMENT OF LCD CONTRAST AND DIMMER

Because of its polarized characteristics, the intensity of the LCD (Liquid Crystal Display) varies with not only the viewing angle of the operator, but also with the environmental temperature and lighting conditions. The CONTRAST-LCD control located at the left-side panel of the unit is provided to adjust the degree of the polarization. Be aware that too clockwise a setting may result in blackening of the entire LCD.




LCD Contrast

The [ ☼ ] key is used to vary the level of backlighting of the LCD display and the brightness of the annunciator LEDs for nighttime operation, in four steps of bright, medium, dim and off. Each time the key is depressed, the level will change in the above sequence. Note that you cannot see the status of the annunciator LEDs at the "off" setting.




Backlight & LED Brightness

## SELECTION OF FACSIMILE STATION AND FREQUENCY

The facsimile station will usually transmit signals at several different frequencies on the HF band (a few stations also transmit on the LF band) for convenience that the probable frequency for a quality recording may be selected at the receiver side. In choosing a receiving frequency, the general rule of thumb is that the highest probable frequency band must be selected for the initial attempt, then move to a low band if the picture is not reproduced satisfactorily.

Since the receiving condition on the HF band is, in practice, greatly affected by the phenomenon of nature (year, season, time, etc.) as well as the distance between the transmitting station and receiver, selection of the probable frequency is required whenever you want to receive a facsimile signal.

To overcome this inconvenience, the FAX-210 employs a scan function which automatically searches the frequencies assigned to a station and locks onto the frequency of which the signal strength is the highest.

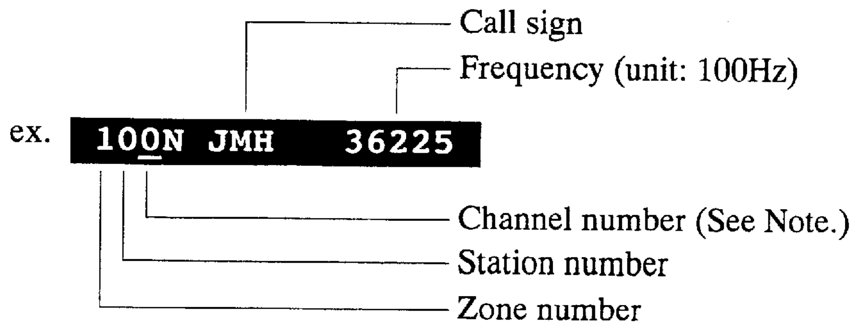
1. If the signal level of more than two channels are the same, the receiver locks onto the frequency.
2. When an LF channel having a certain level is detected, the receiver exclusively locks onto the LF channel irrespective of the signal level of other channel.
3. The receiver recommences scanning if the signal level of the locked channel becomes weak.

Of course, the signal strength can be judged by the clarity of sound heard from the built-in speaker. The sequence of keystrokes to select a desired station would be:

Pressing the [CH] key, the station and frequency data appear on the display. The character where the data entry cursor is placed will be blinking to indicate that the unit is ready to accept the operator's command.

[CH] 100N JMH 36225

Station/Frequency Display [Normal Display]




Note: To activate the scan function, select the asterisk mark "*" instead of a channel number.

Select the zone number of the desired station by scrolling the numbers on the window with the [▲] or [▼] key. Hit the [▶] key to move the cursor to the next data column and set the station number. In the same manner, get into the scan mode by selecting the asterisk "*" on the column of the channel number. If a specific frequency is always received stably in your area, enter the channel number instead of "*".

[◀ ▶] [▲ ▼]

100N JMH

27* NMC

On completion of the data entry, press the [ENT] key and the unit starts scanning the frequencies (channels) assigned for the station. The display will show the message "..* ...SCAN" while scanning, then it will indicate the frequency which the receiver has locked on.

ENT

`27* NMC SCAN`

`27*N NMC 127300`

## TUNING

There are rare occurrences, where the actual receiving frequency slightly deviates from the nominal transmitting frequency. The TUNE indicator, composed of three LEDs, will "flow" upward or downward when the receiving frequency is lower or higher than the preprogrammed frequency data. Press and hold the [▲] key until the indicator stops flowing and only the center LED lights stably. On the contrary, press the [▼] key if the indicator flows downward.

**NOTE 1:** Tuning is inoperative when the scan mode (*) is selected.

**2:** The indicator will always flow for a signal in the LF band or for a picture of which the greater part is occupied by the black signal, irrespective of frequency deviation.

## SETTING THE INTERNAL CLOCK

It is necessary to set the built-in clock to the local time in your area or GMT (Greenwich Mean Time) to properly operate the sleep mode and timer recording. The meaning of the sleep mode and timer recording are described later on.

Press the [RCL/PRG] key and the time is displayed on the window.

RCL/PRG

`TIME 12:34`

Again press [RCL/PRG], then [ENT]. You will see the message "Set CLOCK?" followed by "Set CLOCK xx:xx" on the display.

RCL/PRG

`Set CLOCK ?`

ENT

`Set CLOCK 12:34`

Set the time to two to three minutes ahead of present time by using the arrow keys, and then press the [ENT] key at the exact moment the time signal is released for the start of a new minute/hour.

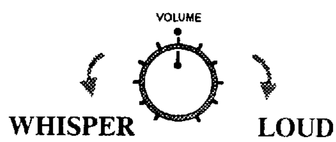
◀ ▶ ▲ ▼

ENT

`Set CLOCK 11:50`

## SETTING MONITOR VOLUME

The unit incorporates a speaker for monitoring the received signal. The MONITOR control located on the left-hand of the panel adjusts the audio output level from the speaker. Adjust the control for an optimum sound level.



# SETTING SPD/IOC

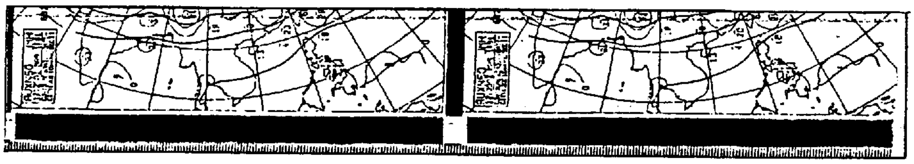
Next, you may have to set the correct SPD/IOC number depending on the facsimile station. SPD and IOC stands for scanning speed and index of cooperation, respectively. These are values necessary to reproduce an exact copy of the picture transmitted from the facsimile station, and are listed on the Facsimile Schedule Book. If the SPD is incorrectly set, a portion of the picture will be overlapped or a multiple picture will be recorded. You will also be notified of a wrong SPD setting by the lighting of the SPD annunciator LED.

Similarly, the picture is foreshortened or expanded to the paper feed direction if the IOC is set incorrectly. Four SPDs and two IOCs are available to meet the requirements of WMO and ITU: 60, 90, 120, and 240 for SPD, and 288 and 576 for IOC. Find the appropriate SPD and IOC of the desired station from the Facsimile Schedule Book and set them following the procedure below.

**Incorrect setting of the SPD/IOC numbers**

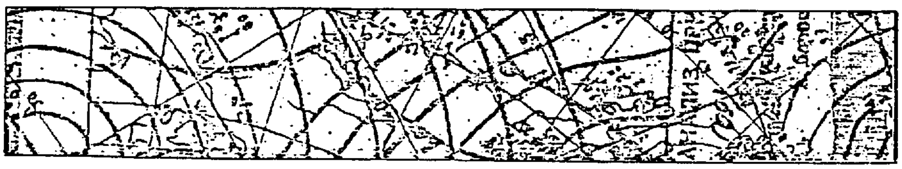
**Two pictures**

Wrong selection of the SPEED number ("60" is selected instead of "120".)



**Overlapped recording**

Wrong selection of SPEED number ("120" is selected instead of "60".)



**Expanded or foreshortened recording**

Wrong selection of the IOC number. When "288 (576)" is selected for transmission with the IOC of "576 (288)", the recording will be extended (foreshortened) in the paper feeding direction.



# STARTING MANUAL RECORDING

Hit the [MODE] key, and the message "Manual START?" will come up on the display. With the [ENT] key pressed, the message will change to "SPD/IOC xxx/xxx".

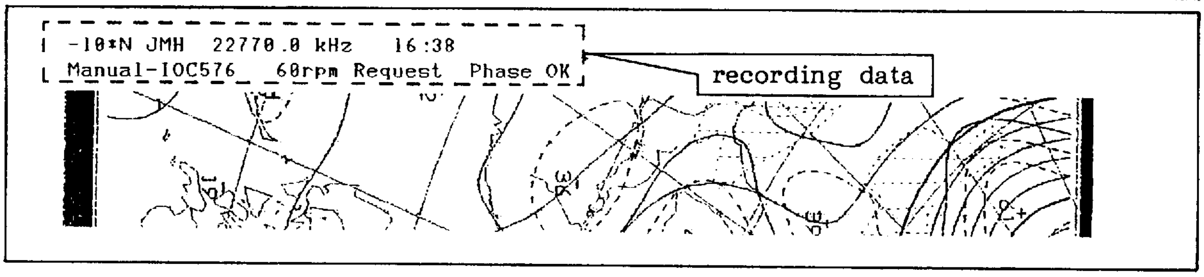
[MODE] **Manual START ?**

[ENT] **SPD/IOC; 60/576**

Scroll the number with the [ ▲ ] or [ ▼ ] key until the proper SPD number appears on the display. Hit the [ ▶ ] key to shift the cursor to the data column for IOC and select the proper IOC in the same manner as SPD selection.

On completion of SPD/IOC settings, press the [ENT] key. Now the printer plots the recording data followed by a picture as shown below.

**27*N NMC 171512**




If you cannot find the correct SPD and IOC for the desired station, try recording at any setting of SPD and IOC. After several inches of printed paper comes out from the unit, check whether the picture is printed normally or not. If not, hit the [SPD/IOC] key, change the value with the arrow keys, and press the [ENT] key.

[SPD IOC] **SPD/IOC; 120/576**

[ ◀ ▶ ] [ ▲ ▼ ]

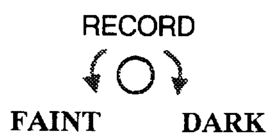
[ENT]

To escape from this mode, press the [SPD/IOC] key. Note that the selection of SPD/IOC by using the [SPD/IOC] key is effective only while the printer is operative.

[SPD IOC]

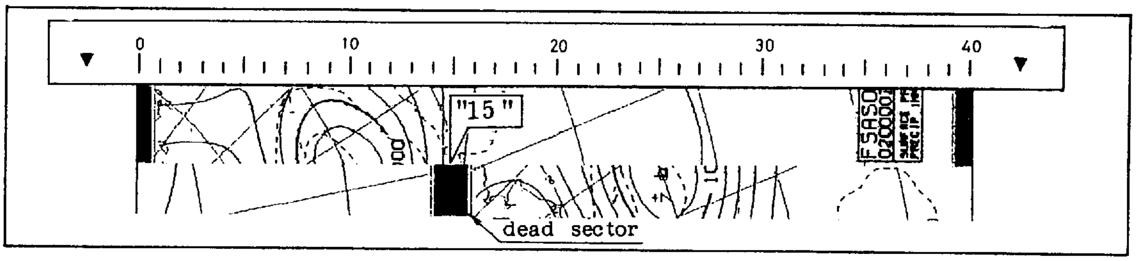
# ADJUSTING DARKNESS OF RECORDING

If you think the recording is too dark or too light, turn the RECORD control on the left-hand panel for an optimum recording darkness. As the print action takes place intermittently, turn the control little by little while watching the recording. Note that too high or too low a darkness setting will degrade the picture quality especially in FM transmission mode.

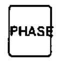


# PHASE MATCHING

When the printer starts recording after the phase signal (see page A - 2) has been transmitted, or when the received signal is too weak to detect the phase signal, the recording may be split into two parts by a thick white (or black) gap called a dead sector as illustrated. The [PHASE] key is provided to compensate for the phase mismatching, shifting the dead sector to the left edge of the recording paper. Should this occur, the PHASE annunciator LED will light up and the message "Phase NG" (Phase No Good) will be printed out as the recording data.

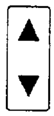



Press the [PHASE] key and the message "Set PHASE 00" appears on the display.




Set PHASE ; 00

Read the scale at the center of the dead sector and enter the value in the data column by using the [▲] or [▼] key. The value to be corrected will range between 0 and 40.



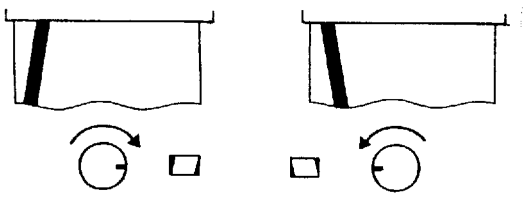
Set PHASE ; 15

Hit the [ENT] key and the dead sector is shifted to the left edge of the recording paper. Note that the [PHASE] key is also effective only while the printer is operative.




# SIGNAL SYNCHRONIZATION

The SYNC control is used to fine tune phase matching. If the dead sector is plotted askew even when the PHASE is properly selected, turn the SYNC control to correct it as illustrated.



# STOPPING PICTURE RECORDING

In the manual recording mode, the printer continues to operate even after the picture is printed since the unit doesn't detect the "remote control signal" (start and stop signal of the picture) in this mode. The key sequences to manually stop printing are as follows.

Press the [MODE] key and the display will indicate the message "MANUAL STOP?" for verification. Hit the [ENT] key. Now the printer stops recording and the unit is restored to the normal mode, indicating the channel data.




Manual STOP ?




Manual STOP

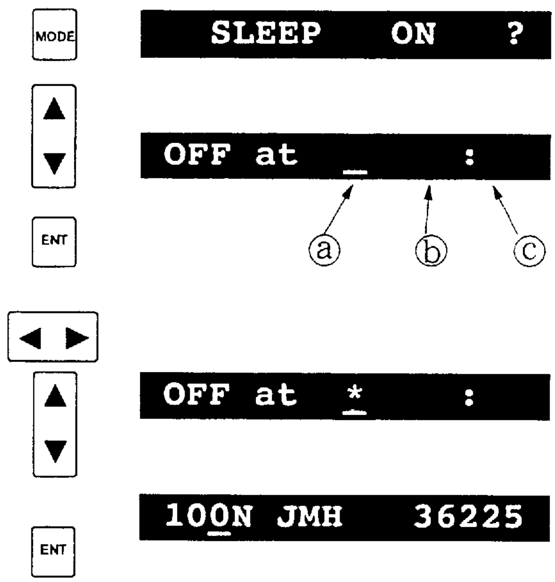
# SLEEP MODE

As noted in the above section, the manual mode requires that you manually stop the printer after a picture is received, which can be quite a nuisance if you are preoccupied with other tasks. To free the operator from this inconvenience and to minimize recording paper consumption, an automatic stop of the recording is available.

There are two ways which the "time to stop recording" may be selected; "timer sleep" and "remote sleep." In the "timer sleep," the printer stops recording at the time preset by the operator, while the "remote sleep" operates by detecting the "remote control signal." Note that once the printer ceases operation, indicating only the message "OFF Facsimile," the unit is inoperative just as if it were turned off. To restore the unit to normal operation, press the [MODE] key. The key sequences to operate the sleep mode are as follows.

Press the [MODE] key, then scroll the menu with the vertical arrow keys to display the message "SLEEP ON?". Hit [ENT] and the message will change to "OFF at : ". If the [ENT] key is pressed again while the data columns remain blank, the printer stops immediately and gets into the sleep mode.

To operate the "timer sleep," enter the desired time into data columns ⓑ and ⓒ . The "remote sleep" is activated by setting the asterisk "*" on the data column ⓐ by using the vertical arrow keys. After completing the setting, press the [ENT] key to set the unit in the sleep mode.




> **NOTE**
>
> *A priority NAVTEX message takes precedence over a facsimile recording. If a priority NAVTEX message is received during the printing out of a facsimile recording, the facsimile recording is interrupted, the NAVTEX message is printed out, and then the remainder of the facsimile recording is printed out.*

# TIMER RECORDING

Most of the LF to HF facsimile broadcasts all over the world are regularly serviced according to a schedule issued by the meteorological observatory in each country. Therefore, if you wish to receive a certain facsimile broadcast on a daily basis, the timer recording mode will virtually allow you "hands-off" automatic operation (self start and stop of the printing) once it has been preprogrammed.

## ENTRY OF PROGRAM TIME

You may preset up to 16 programs a day for timer recording. Prepare the Facsimile Schedule Book including the time table for your area and record the broadcasting start and end time of the desired stations onto a notebook for reference. (You may use the form provided at the end of this manual.)

1. Press the [RCL/PRG] key twice, then scroll the menu with the [ ▲ ] or [ ▼ ] key until the message "Set Schedule?" appears on the display.

   RCL/PRG RCL/PRG ▲ ▼

   `Set Schedule ?`

2. Hit the [ENT] key and the message will change to the data entry display for the program timer, of which the data columns are arranged as shown below. In order to call up the data column for the program end time, scroll the display leftward by using the [ ▶ ] key.

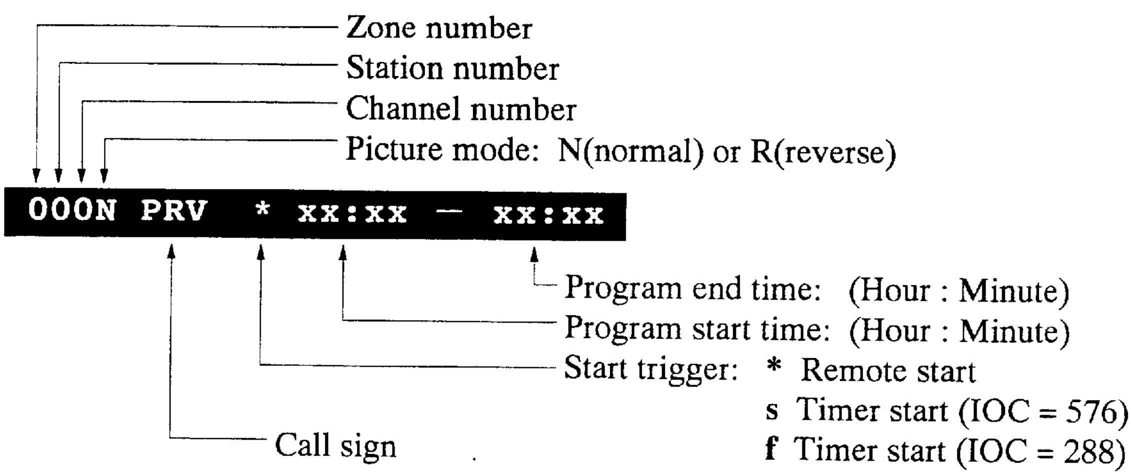
   ENT

   `000N PRV * 0:00`

   If the timer programs has been preset in full, the message "Schedule Full!" will appear instead of the data entry display and the unit reverts to the normal mode.

   `Schedule Full !`

**The data column is arranged as follows.**



**Picture mode:** Some facsimile broadcast stations transmit a "reverse picture," white characters on a black background. The method which each station broadcasts the picture has been programmed into the memory. However, if a newly established station transmits a reverse picture, you should designate the picture mode as "R" to receive it in the normal black-on-white mode. (Recording in black-on-white mode is recommended to reduce thermal duty of the printer head and to keep its life long.)

**Start trigger:** Two trigger modes are selectable; remote start or timer start.

[Remote Start] In the "remote start mode," the printer operates in response to the "remote control signal" (start and stop signals of a picture) from the transmitter. The IOC number is also correctly chosen by the remote control signal.

[Timer start] In the "timer start mode," the printer operates in accordance with the programmed timer irrespective of the presence or absence of the facsimile signal. The proper IOC (576 or 288) must be chosen by the operator in this mode. Note that the timer start will not operate for a signal having a white dead sector.

In practice most of the facsimile stations transmit the "remote control signal" according to the WMO standard, so it is recommended to select the "remote start mode" to ensure reception of the entire picture and to minimize paper consumption.

For example, suppose that you want to receive the facsimile signal transmitted from station NAM in Norfolk, Virginia, U.S.A. by the "remote start mode."

Zone: 5, Station: 3, Frequency: Scan mode, Start trigger: * ,
Receiving Time: 13:20 to 13:45

3. Move the cursor to the bottom of the zone column with the [ ◀ ] key and scroll the number to obtain "5" by using [ ▲ ] or [ ▼ ] key. Enter the station, frequency, start trigger and program start time.

   `500N * 0:00`

   [◀ ▶] [▲ ▼]

   `53*N NAM *13:20`

4. With the [ ▶ ] key pressed when the cursor is located at the far right side of the data column, the data entry display is scrolled leftward and the cursor jumps to the data column of the program end time. Enter "13:45".

   [▶]

   `*13:20 — 13:45`

5. When data entry is completed, press the [ENT] key. The message "SET" will appear for about two seconds to notify the operator that the unit has accepted his command.

   [ENT]

   `S E T`

6. Repeat steps 1 through 6 to enter other scheduled programs.

7. To activate the timer function, hit the [MODE] key, scroll the message in order to display "TIMER ON" on the LCD window and then press the [ENT] key. Now the display will be changed to the programmed schedule closest to the present time. If no schedule is programmed, the message "No Schedule !" will be displayed.

MODE
ENT

TIMER ON ?

No Schedule !

8. Refer to page 1- 11 to activate the timer sleep.

<u>**Caution on Programming Timer**</u>

- When two programs overlap each other, the latter program becomes invalid. For instance, if the start/stop time of the program A and B are set to 2:00 - 2:30 and 2:15 - 2:40 respectively, the program B will not be recorded.

- When selecting the remote start mode, the program start time should be set at least one minute earlier than the actual broadcasting time in order to acquire the remote control signal without error.

- When selecting the channel scan mode (*), the program start time should be set at least two minute ahead of the actual broadcasting time in order to reserve time for searching a frequency with the highest signal strength.

## REVISION OF PROGRAM TIME

If you want to partially change the programmed schedules, for instance, the broadcasting time of a specific station has been changed, perform the following keystrokes to quickly call up and update the time data.

Press the [RCL/PRG] key once, scroll the message in order to obtain "Recall Schedule?" with the [ ▲ ] or [ ▼ ] key, then hit [ENT].

RCL PRG

▲ ▼

Recall Schedule?

Of the preprogrammed schedules, one having the earliest start time in a day will be called up first. Scroll the display with the vertical arrow keys to see the schedule to be revised; pressing the [ ▲ ] key calls up the schedule from an earlier time setting and the [ ▼ ] key, from a later time setting.

ENT

53* NAM * 2:10

▲ ▼

52* WLO *17:25

Press [RCL/PRG] again to get into the timer program mode. Update the schedule in the same manner as the "Entry of Program Time." See page 1- 13.

RCL PRG

52* WLO *17:25

# ERASING PROGRAMMED SCHEDULE

If necessary, the programmed schedule can be erased partially or totally by using the following keystrokes.

## Partial Erasure

Perform the same keystrokes as "Revision of Program Time" to get the program schedule.

Press and hold the [ ▶ ] key to scroll the display leftward until the program end time appears on the window.

[▶] `52* WLO *17:25`

`*17:25 – 17:45`

Change the program start time to the same time as the program end time (or vice versa) with the [ ▲ ] or [ ▼ ] keys, then press [ENT]. After displaying the message "Erase" for about two seconds, the unit reverts to the normal display.

[▲] [▼] `*17:45 – 17:45`

[ENT] `Erase`

## Complete Erasure

Press the [RCL/PRG] key twice, then scroll the message with the [ ▲ ] or [ ▼ ] key in order to display the message "Erase Schedule?".

[RCL/PRG] [RCL/PRG] `Erase Schedule ?`

[▲] [▼]

Hit the [ENT] key and the message will change to "Erase OK? (Y/N)", verifying your command to avoid inadvertently erasing the programmed schedule by accidentally pressing the [ENT] key. Place the cursor under the character "Y", then hit the [ENT] key. After indicating the message "Erase" for about two seconds, the unit reverts to the normal display.

[ENT] `Erase OK ? (Y/N)`

[ENT] `Erase`

If the unit gets into this mode by mis-operation, move the cursor to the character "N" and press the [ENT] key. The display will show the message "Escape" and the unit will return to the normal display.

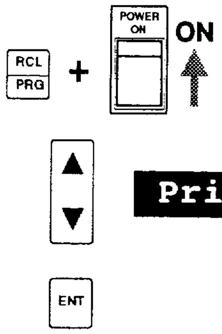
[▶] `Erase OK ? (Y/N)`

[ENT] `Escape`

# PRINTING SCHEDULED PROGRAM

The scheduled programs can be printed out for reference.

Turn off the unit then hold the [RCL/PRG] key while turning on the POWER switch. Scroll the menu by using the [ ▲ ] or [ ▼ ] key to display the message "Print Schedule?". With the [ENT] key pressed, the printer will print the schedules as shown below.




**Print Schedule ?**

```
              ***  Schedule   ***

     27*   NMC                *15:03  - 15:13
     27*   NMC                *17:18  - 17:30
     26*   CKN                *21:48  - 22:10
```

Start Trigger
(Remote start)

# UPDATING PROGRAMMED STATION/FREQUENCY

All frequency data for existing facsimile stations are factory-preprogrammed in the memory. However, if the transmitting frequency of a specific station is changed or a facsimile station is newly established, it is necessary to update the contents of the memory following the procedure shown below.

## CHANGING PREPROGRAMMED FREQUENCY DATA

For example, assuming that the Kodiak, Alaska station will change the frequency in channel number 4 from 17192kHz to 17183kHz, perform the following keystrokes.

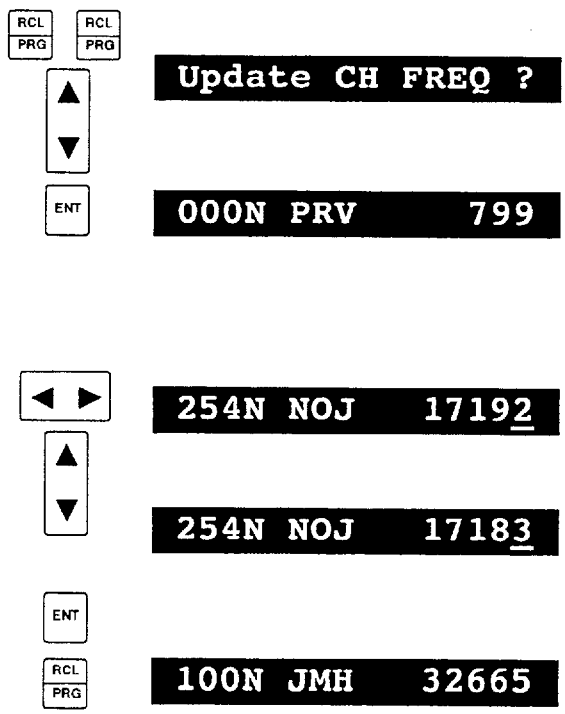
To call up the updating mode, press the [RCL/PRG] key twice and the message "Update CH FREQ?" will appear on the display.

Hit the [ENT] key and the data entry display "000N PRV 799" appears on the window.

Place the cursor on the zone column by using the horizontal arrow key and select the number 2 with the [ ▲ ] key. Similarly, set the station and channel number to 5 and 4, respectively.

Move the cursor to the frequency column and select the numbers 1, 7, 1, 8 and 3 with the arrow keys.

After verifying that the correct frequency data is selected, press the [ENT] key to store it in the memory. To return to the normal display, press the [RCL/PRG] key again.




## ADDING A NEW FREQUENCY

A new frequency may be added into the extra memory area (up to 340 channels) allocated in the zones tabulated on the next page. You may enter the frequency data into any channel of these zones. However, for convenience sake, it is recommended to select the zone in which you are fishing, sailing, etc. If you want to distinguish the data newly entered from the programmed one, zone "0" should be selected since it is exclusively allocated as a private channels. The operating procedure is the same as the above section "Changing Preprogrammed Frequency Data."

Note: The call signs (PRV, AUX) assigned to these zones cannot be changed.

The frequency data updated by the user may be erased when initializing the unit as described on page 1-6.

| None Number | Station Number | Call Sign | Channel Number (channels) |
|---|---|---|---|
| 0 | 0 | PRV | 0 ~ 9 (10) |
| | 1 | PRV | 0 ~ 9 (10) |
| | 2 | PRV | 0 ~ 9 (10) |
| | 3 | PRV | 0 ~ 9 (10) |
| | 4 | PRV | 0 ~ 9 (10) |
| | 5 | PRV | 0 ~ 9 (10) |
| | 6 | PRV | 0 ~ 9 (10) |
| | 7 | PRV | 0 ~ 9 (10) |
| | 8 | PRV | 0 ~ 9 (10) |
| | 9 | PRV | 0 ~ 9 (10) |
| | A | PRV | 0 ~ 9 (10) |
| | B | PRV | 0 ~ 9 (10) |
| 1 | B | AUX | 0 ~ 9 (10) |
| 2 | 9 | AUX | 0 ~ 9 (10) |
| | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |

| None Number | Station Number | Call Sign | Channel Number (channels) |
|---|---|---|---|
| 3 | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |
| 4 | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |
| 5 | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |
| 6 | 9 | AUX | 0 ~ 9 (10) |
| | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |
| 7 | 9 | AUX | 0 ~ 9 (10) |
| | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |
| 8 | 9 | AUX | 0 ~ 9 (10) |
| | A | AUX | 0 ~ 9 (10) |
| | B | AUX | 0 ~ 9 (10) |

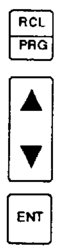
# RECALLING/PRINTING FREQUENCY DATA

All frequency data stored in the memory (including the one entered by the user) can be recalled on the display or printed on the recording paper for reference.

## Recalling

Hit [RCL/PRG] followed by [▲] or [▼] to obtain the message "Recall CH FREQ ?" on the display. Press the [ENT] key and the display will show the channel data previously selected.

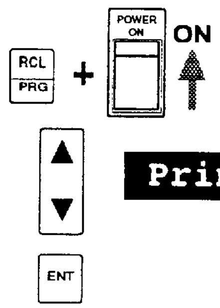
By using the arrow keys, select the desired station and frequency number.




**Recall CH FREQ ?**

In order to escape from this mode and to return to the normal display, press the [ENT] key.

## Printing




In order to print the frequency data turn off the unit, then hold the [RCL/PRG] key while turning on the POWER switch. Scroll the display with the vertical arrow keys to see the message "Print FREQ ?", then hit the [ENT] key. When the printing is completed, turn off the unit to escape from this mode.

**Print CH FREQ ?**

```
                        *** Channel Frequency ***

---------------------------  Zone No.0  ---------------------------
Station - 0     PRV
  799     799     799     799     799     799     799     799     799     799

Station - B     PRV
  799     799     799     799     799     799     799     799     799     799

---------------------------  Zone No.1  ---------------------------
Station - 0     JMH
 36225   49020   73050   99700  135970  182200  235229
Station - 1     JMJ
 33650   54050   94380  146925  184412
Station - 2     JJC
 43160   84675  127455  169710  170696  225420  162700  238641
```

# SELECTION OF NAVTEX STATION AND MESSAGE

This section describes the operating procedure for selecting NAVTEX stations and the categories of messages to be received.

As stated in detail in Appendix A of this manual, the header code of all messages are prefixed by a four character group; the first character denotes the identity of the transmitting station, the second specifies the category of message and the next two give serial numbers between 00 and 99 in transmitting order. It should be noted that serial number 00 is exclusively assigned to an important emergency message. The list below shows the category of each message. As for the station list, refer to page B-5.

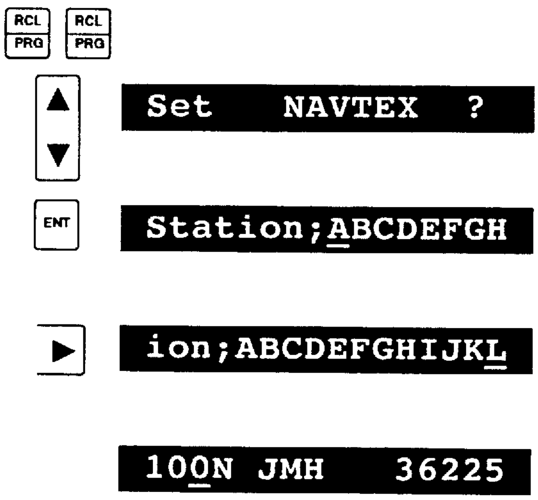
**A.** Coastal navigational warning
**B.** Meteorological warning
**C.** Ice report
**D.** Search and Rescue Alert
**E.** Meteorological forecast
**F.** Pilot message
**G.** Decca message
**H.** Loran C message
**I.** Omega message
**J.** Differential Omega message
**K.** Other electronic Navaid system messages
**L.** Navarea warnings
**M-Y.** No category assigned
**Z.** QRU (no message on hand)

Any category from the above list may be selected. However, all NAVTEX receivers are required to print out messages A, B and D, which are considered essential for warning of hazards or other information of concern to the oceangoing navigator. When the NAVTEX signal is received during reception of a facsinile signal, the NAVTEX message is stored in the memory and is printed when the facsimle reception is completed . Note that a message type "D" will be printed immediately even when facsimile recording is in progress. If required, the FAX-210 can sound an audio alarm when receiving a D type message, in addition to the lighting of the SAR MSG (Search And Rescue Message) annunciator LED.

## SELECTION OF STATION AND MESSAGE

1. Press the [RCL/PRG] key twice, then scroll the menu by using the [ ▲ ] and [ ▼ ] keys in order to display the message "Set NAVTEX?".

2. Hit the [ENT] key, and the NAVTEX stations will be displayed with their identification letters A to H in alphabetical order. The remaining letters I to Z may be called up by scrolling the window rightward with the [ ▶ ] key; place the cursor to the right end of the display window by using [ ▶ ], then further press the [ ▶ ] key. The window will scroll rightward to show the next series of letters.



3. Selection or deselection of the NAVTEX station is made by setting the identification character to a capital letter or small letter respectively. Pressing the [▲] or [▼] key alternates the letter, where the cursor is placed, between capital and small.

   [▲/▼] `Station;abcdefgh` ↕ `Station;abcdEfgh`

4. For example, assume that you want to select Reykjavik, Iceland, of which the identification letter is R. Press and hold the [▶] key until the cursor is placed under the letter "r", then hit either the [▲] or [▼] key to change "r" to "R", followed by [ENT]. Now the selection of the NAVTEX station is completed and the message "SET" will appear for a while on the LCD display.

   [▶] `tion;abcdefghijk`

   [▲/▼] `cdefghijklmnopqR`

   [ENT] `S E T`

5. Next, the NAVTEX message categories will come up on the window. In the same manner as the station selection, set your desired category codes to capital letters. As mentioned before, the message categories A, B and D are mandatory, thus these will remain in capital letters even if you hit the [▲] or [▼] key.

   `Message;ABcDefgh`

6. Again press the [ENT] key. Now the unit will proceed into the alarm mode after indicating the message "SET" for about two seconds.

   [ENT] `S E T`

7. In the alarm mode, either the message "Audio Alarm ON?" or "Audio Alarm OFF?" is displayed on the LCD window. These messages may alternately be selected with the [▲] or [▼] key. To have the audible alarm on SAR message reception, select "Audio Alarm ON?", then press [ENT].
   In order to disable the audible alarm, select "Audio Alarm OFF?", then press the [ENT] key. The "AUDIO" lamp on the front panel lights to alert that the SAR audible alarm is disabled.

   `Audio alarm ON ?`

   `Audio alarm OFF?`

   [ENT]

   [ENT]

The figure below shows an example of the NAVTEX message. The message always starts with the four characters "ZCZC" plus space, followed by the header code, then the main text and concludes with "NNNN".

```
ZCZC GA45
WZ 884
DOVER STRAIT
CABLE LAYING OPERATIONS IN PROGRESS BETWEEN FOLKESTONE AN*D SANGATTE
CABLE VESSELS LOCATED IN ENGLISH AND FRENCH INSHORE TRAFFIC ZONES
DETAILS IN REGULAR BROADCASTS BY CHANNEL NAVIGATION INFORMATION
SERVICE VHF10 DOVER VHF11 GRIS NEZ
CANCEL WZ 876 (GA41)
NNNN
```

If any character in the header code is missing because the receiving condition is marginal, the printer will type an asterisk "*" instead of the lost letter.

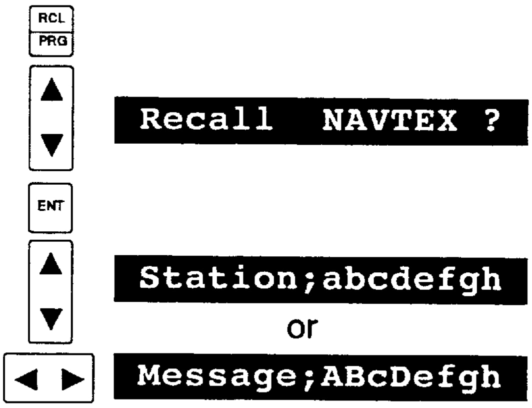
Similarly when more than 33 percent of the characters of the main text are lost (the asterisk "*" is typed in place of the actual letter), the printing is stopped.

Note that the message having serial No.00 (e.g., SAR message) is reprinted whenever it is received.

## VERIFICATION OF NAVTEX STATION AND MESSAGE TO BE RECEIVED

You may verify the setting for NAVTEX reception (station and message ID) by the LCD display or the printer.

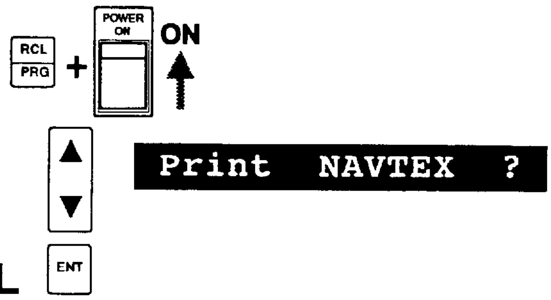
Press the [RCL/PRG] key and scroll the menu with the [ ▲ ] or [ ▼ ] key so that the message "Recall NAVTEX?" is displayed on the window. Hit [ENT], then an arrow key to obtain the desired display.




[▲] [▼] Alternately changes the display to either station or message data.

[▶] : Scrolls the display to the left.
[◀] : Scrolls the display to the right.

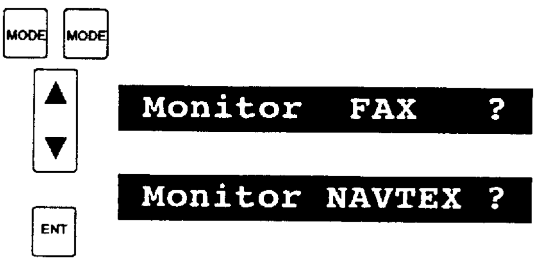
To print out the setting for NAVTEX reception, first turn off the unit, then hold the [RCL/PRG] key while turning on the POWER switch. Scroll the display with the [ ▲ ] or [ ▼ ] key to obtain the message "Print NAVTEX?", followed by pressing the [ENT] key. When the print is completed, turn off the unit to escape from this mode.




## MONITORING THE NAVTEX SIGNAL

If necessary, you may monitor the NAVTEX signal instead of the facsimile signal.

Pressing the [MODE] key twice, either the message "Monitor FAX?" or "Monitor NAVTEX?" is displayed on the window. Select the message "Monitor NAVTEX?" with the [ ▲ ] or [ ▼ ] key (these keys alternately select the above messages), then hit the [ENT] key.



# RECEPTION BY EXTERNAL RECEIVER

The unit requires no external receiver for normal use because most of the LF and HF weather facsimile broadcast frequencies are preprogrammed in the memory. Under very critical signal conditions, however, the FAX-210 may be operated by using AF signal from a high sensitivity external receiver.

1. Connect the AF output of the external receiver to the EXT SIG terminal on the unit ( Refer to page 4 - 10 for details). Generally the optimum level of AF signal (1mW/600ohms) may probably be taken out from LINE OUT of the receiver. Adjustment of the AF signal level is very important. If the level is insufficient (less than 0.1mW) the unit will not operate, if it is too high (more the 10mW) the recorder circuitry may be damaged. In practice, it is essential to tune the receiver in the desired station, and then gradually increase the AF output to the rated level.

2. Set the MODE and BANDWIDTH selectors of the receiver to "CW" and "NARROW (approx. 1kHz)". Turn the RF GAIN control fully clockwise and set the AGC switch to "OFF". Place the BFO control at the mid point of its travel and set the receiver to the desired frequency. Adjust the VOLUME and BFO controls for a clear facsimile signal.

   **Note:** To receive an ISB station, it may be necessary to shift the frequency within ± 2kHz relative to the assigned frequency.

3. Set the RECEIVER switch to the "EXT" position.

4. Apply the power to the FAX-210. The message "999N" is displayed on the LCD Display. (The "N" denotes the picture mode is Normal. If the transmitting station transmits facsimile signal with reversed spectrum, change "N" into "R". For further details, see page 1 - 14.)

5. Get the message "SPD/IOC xx/xx" on the display window by pressing the [MODE] key followed by the [ENT] key, and set the proper SPEED and IOC number referring to the Facsimile Schedule Book.

6. On completion of the SPD/IOC settings, press the [ENT] key to activate recording. Gradually increase the AF signal level so that the picture is plotted on the recording paper. If necessary, readjust the BFO control for a clear recording.

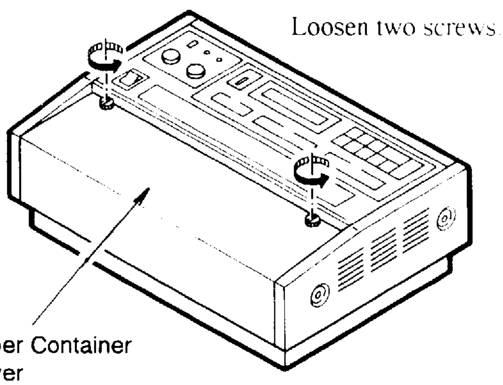
7. When interference or noise is heavy, try to shift the TUNING dial within 300Hz of the assigned frequency to obtain a better picture. A narrower bandwidth is better for rejecting noise. However if the resolution of picture becomes poor, select a wider bandwidth.

# REPLACING THE RECORDING PAPER

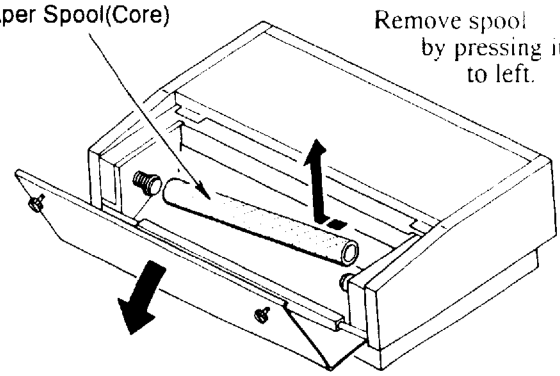
When the recording paper runs out completely, a distinct beep sound is released for about one second and the PAPER (out) annunciator LED lights to call the operator's attention. The message "PAPER OUT" also appears on the LCD display.

In the conventional facsimile receiver using a recording stylus, the operator must carefully note the remaining length of the recording paper since lack of paper may cause serious damage to the stylus. In most cases, shortage of paper will be acknowledged by an "end of roll mark" printed on the paper. Similar to the conventional facsimile recorder, the FAX-210 acknowledges "end of roll" by printing a 50cm-long red line when about 1m of paper remains. However, there is no need to worry about damage to the printing head since the printing mechanism stops automatically when the paper runs out.

1. Loosen two screws securing the paper container cover. Open the Paper Container Cover.

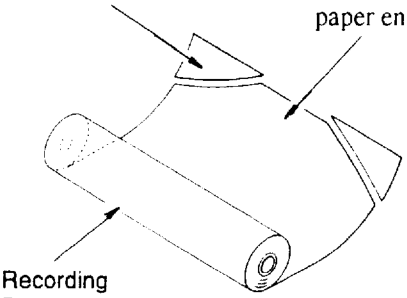



2. With the spool catch pushed leftward, take out the Paper Spool. (If there is paper remaining, feed it out by pressing the [ ⊛ ] key.)




3. Cut both corners of the paper end and curve it to ensure smooth feeding.

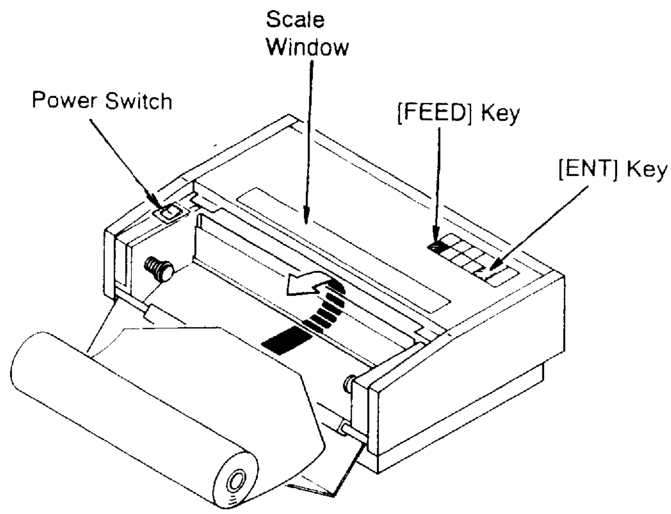
| |
|---|
| Thermal Recording Paper<br>Type: TP-1030A<br>Code: 000-802-891 |



4. Insert the paper into the slot just above the container until you see the paper through the scale window. The PAPER (out) LED should go off.

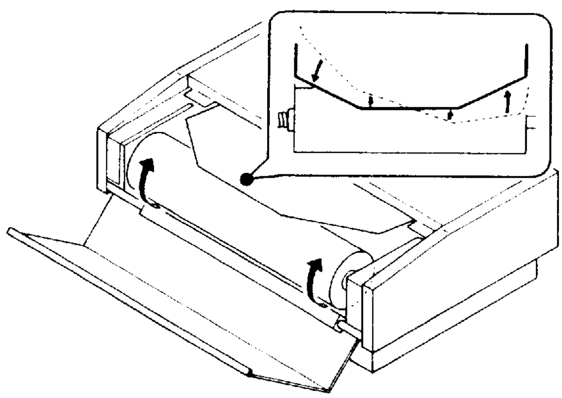
5. Press the [ ⊙‾ ] (FEED) key to feed out the paper from the slot below the scale.

   * If the paper cannot be fed out, check that it is properly reached the feed roller.




Insert paper until it comes up to the pinch roller, and then press the [FEED] key.

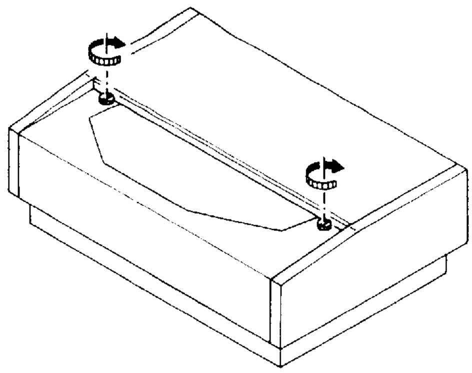
6. Fasten the paper roll between the spool catches and tighten slack by rewinding the roll. Check that the paper is aligned evenly.



Straighten the paper.

7. Close the paper container cover.

8. Press the [ENT] key to return to the normal operation mode.



Pulling out the paper, fasten the paper container cover.

# CHAPTER 2 MAINTENANCE

## GENERAL MAINTENANCE

The-equipment will maintain optimum performance for a reasonably long period. However, continued performance can not be expected without periodic inspection and maintenance. Important points to be checked from time to time are tabulated below.

| Check Item | Action |
|---|---|
| whip antenna | If cracked or broken, replace it with a new one. |
| antenna wire,<br>coaxial cable | If sheath has peeled, seal with vinyl tape.<br>If wet, stretch new coaxial cable. |
| junction of whip antenna and preamp | If corroded, clean and waterproof with sealing compound. |
| coaxial plug connection | If loosened, reconnect. If corroded, clean the contacts. |
| power plug connection | If loosened, reconnect. If corroded, clean the contacts. |
| batteryconnection (for dc mains) | If corroded, clean power trminals. |
| grounding terminal | If corroded, clean terminal. |

## CLEANING

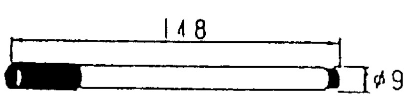
The unit should be kept clean and dry at all times. Dust or loose dirt can be wiped off with a soft and dry cloth. To remove thick and heavy dirt, use a mild detergent and water on a soft cloth.

**CAUTION !!!**

*Never use plastic solvents, such as thinner or acetone, for cleaning. These chemicals can harm the cabinet coating, keys and the display window.*

## THERMAL HEAD CLEANING

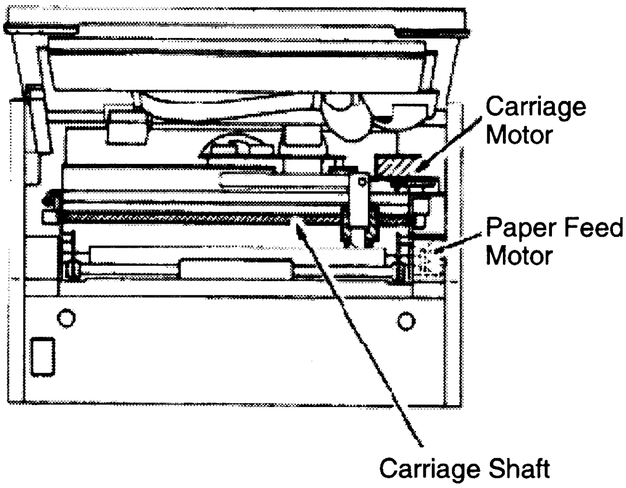
The estimated life of the thermal head is approximately 50 rolls. To maintain quality recording, however, it should be cleaned in every 3 to 5 rolls of recording. Gently wipe off the dirt on the recording surface by using the head cleaner stick supplied.




Head Cleaner Stick

# LUBRICATION

For recording pictures the carriage moves right and left on the shaft. Too heavy friction on these components can cause uneven recording or damage to the carriage motor. In every six months, wipe out the dirt on the carriage shaft and apply thin coat of oil on it. At the same time apply a drop of oil on each reduction gear of the carriage drive motor and paper feeding motor. Use the oil and oil pot supplied as the accessories.



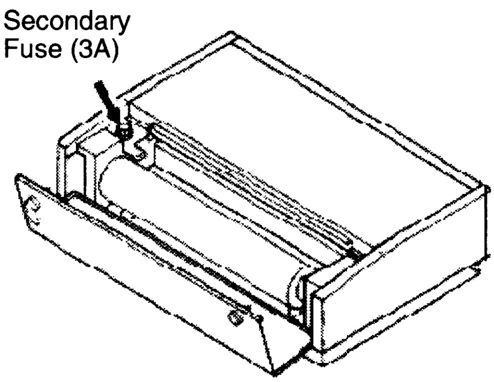

**CAUTION !!!**

*Do not over lubricate. Spilt oil can cause damage to the rubber rollers or electronic components inside the recorder.*

# REPLACING THE FUSE

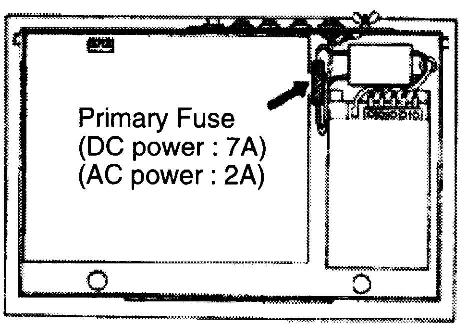
To protect the equipment from serious damage, two fuses are provided at the input and output of the internal power supply pack.

The primary (input) fuse is located inside the mounting cradle, and protects against overvoltage/reverse polarity of the ship's mains. When the input fuse blows, first check the input voltage and polarity before replacing it with new one.




The secondary (output) fuse is located inside the paper container cover, and protects against the internal fault of the equipment. When the output fuse blows, replace it with new one.

If the fuse blows again, call service technician for rpair.




**⚠ CAUTION**

**Use the correct fuse.**

Use of the wrong fuse can cause fire or equipment damage.

# REPLACING THE BACKUP BATTERY

A lithium battery is used to keep the memory alive, and its estimated life is approximately 5 years. If your unit is exhibiting any of the symptoms shown below, the battery should be replaced. After replacing the battery, always execute the "Cold Start" to clear erratic data from the memory. Refer to page 1 - 6 for "Cold Start" procedure.

### Symptoms When the Battery Voltage is Low

1. The contents of the memory are erased.
2. The time of the internal clock is incorrect.
3. Power cannot be applied.

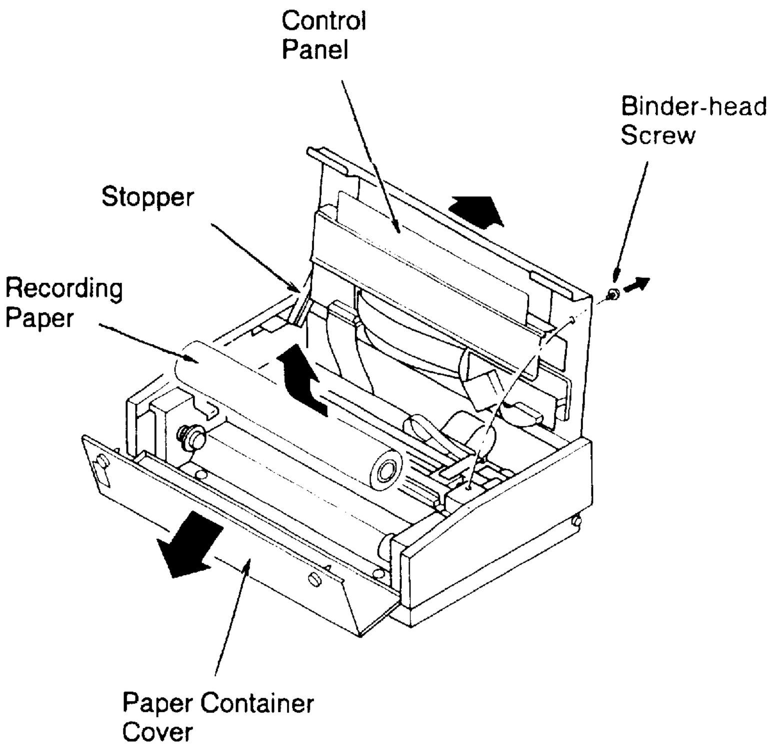
**Note:** Frequencies updated or added by operator and timer schedule will be lost by replacing the backup battery. It is recommended to print out the frequency list and schedule list beforehand. (Refer to pages 1 - 19 and 1 - 17.)

### [ Procedure ]

1. Unplug the POWER connector at the rear panel of the unit.

2. Open the paper container cover, and then remove the recording paper.

3. Loosen two binder-head screw, and flip up the control panel until it is locked by the stopper.



4. Detach the side plates and the support plates.

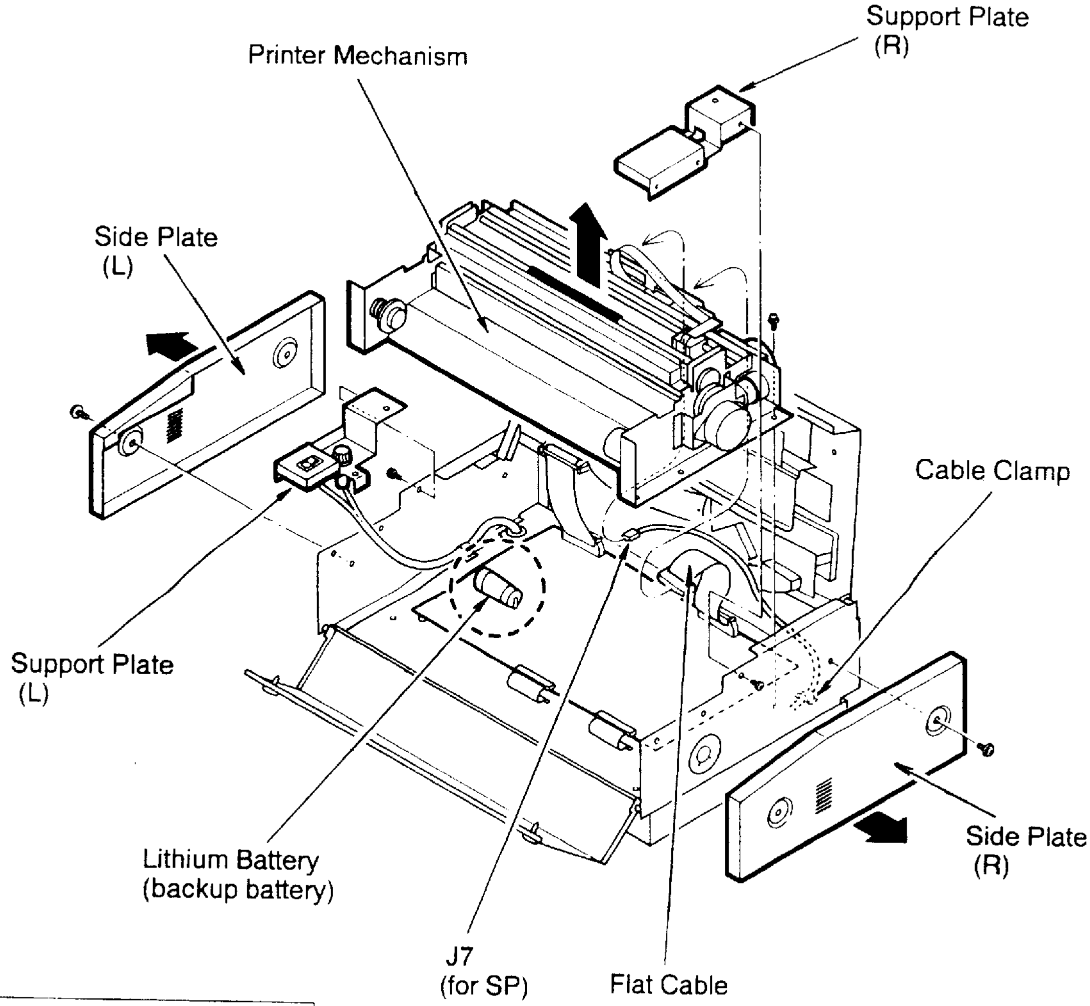
5. Unplug plug the flat cable connector and J7(for speaker) behind the printer mechanism.

6. Take off the cable from the cable clamp at the rear-right corner in the recorder housing.

7. Loosen the six screws fixing the printer mechanism, and then remove the printer mechanism.

8. The lithium battery is soldered on the MAIN CPU board. Replace it with new one.

9. Reassemble the components as they were.




| |
|---|
| Lithium Battery<br>Type: ER6CN4 3.6V<br>Code No. : 000-126-013 |

# REPLACING THE PRINTER HEAD

The estimated life of the printing head is about 500,000 lines. If picture quality gets poor, and cannot be improved by cleaning the printing head or by adjusting the RECORD (print darkness) control, the printing head should be replaced.

**⚠ CAUTION**

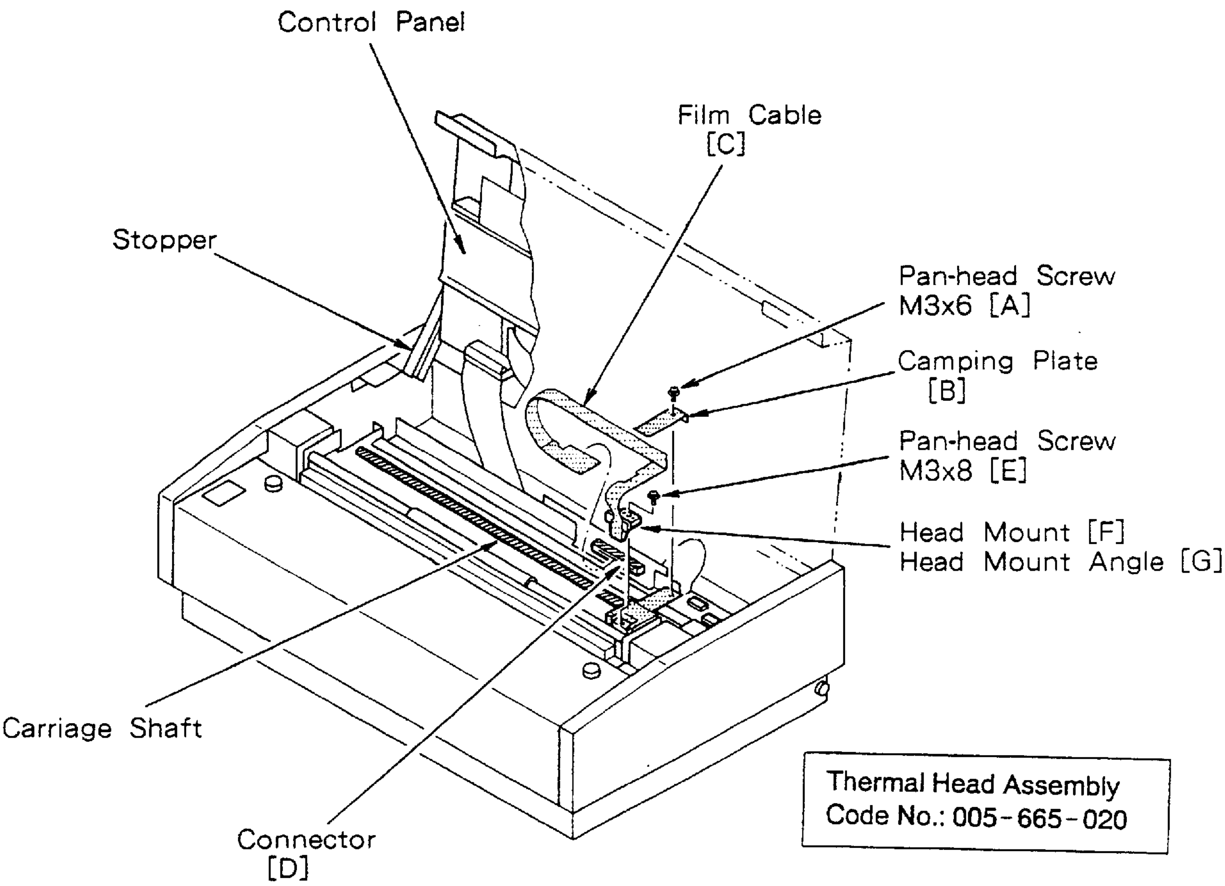


**Do not touch printing head just after printing.**

Burn can result.

**NOTE**

1) Do not touch the printing surface of the head to permit good contact with the recording paper.
2) Perform the Self-test to check and evaluate the condition of the printing head. (See page 3-3.)
3) Ensure that no stress is applied to the film cable even when the head moves to the ends of the carriage shaft.
4) Do not hit or scratch the carriage shaft or platen plate. Deformation or dent on these components will result in poor recording quality or even cause permanent damage to the drive motor or recording mechanism.



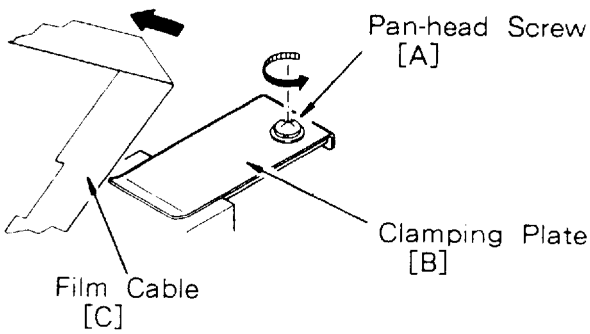

Thermal Head Assembly
Code No.: 005-665-020

**[ Procedure ]** Refer also to preceding page for overall view.

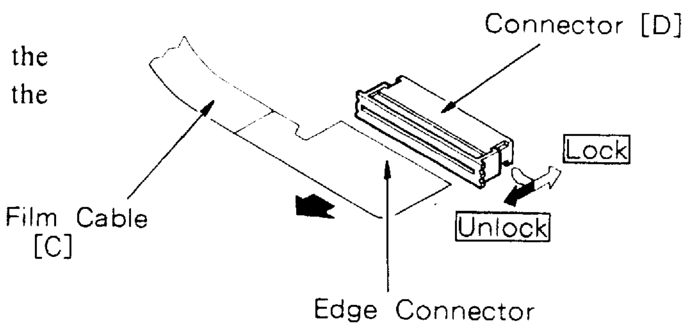
DISASSEMBLING

1. Flip up the control panel after loosening two binder-head screws.

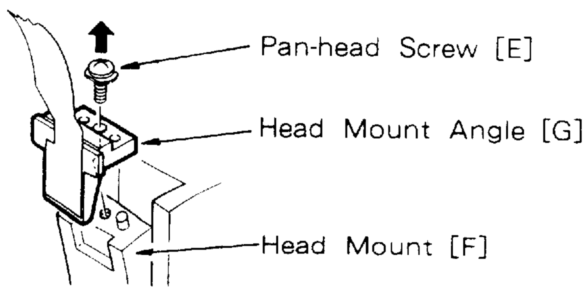
2. Slightly loosen the pan-head screw [A] on the clamping plate [B], and pull out the film cable [C].



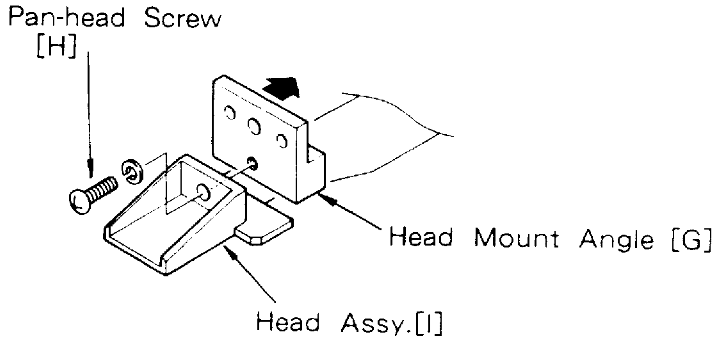

3. Pull out the film cable [C] from the connector [D] after unlocking the clutch.




4. Detach the head mount angle [G] (together with the flat cable) from the head mount [F] after removing the pan-head screw [E].

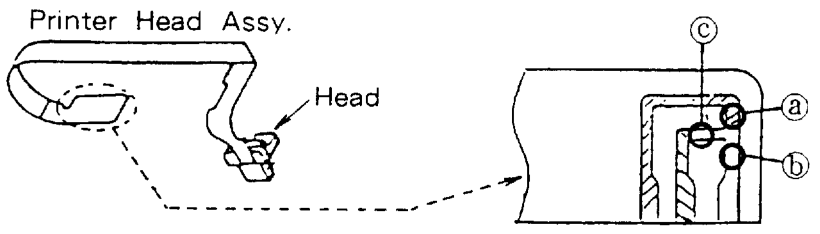



5. Separate the head assy [I] from the head mount angle by loosening the pan-head screw [H].



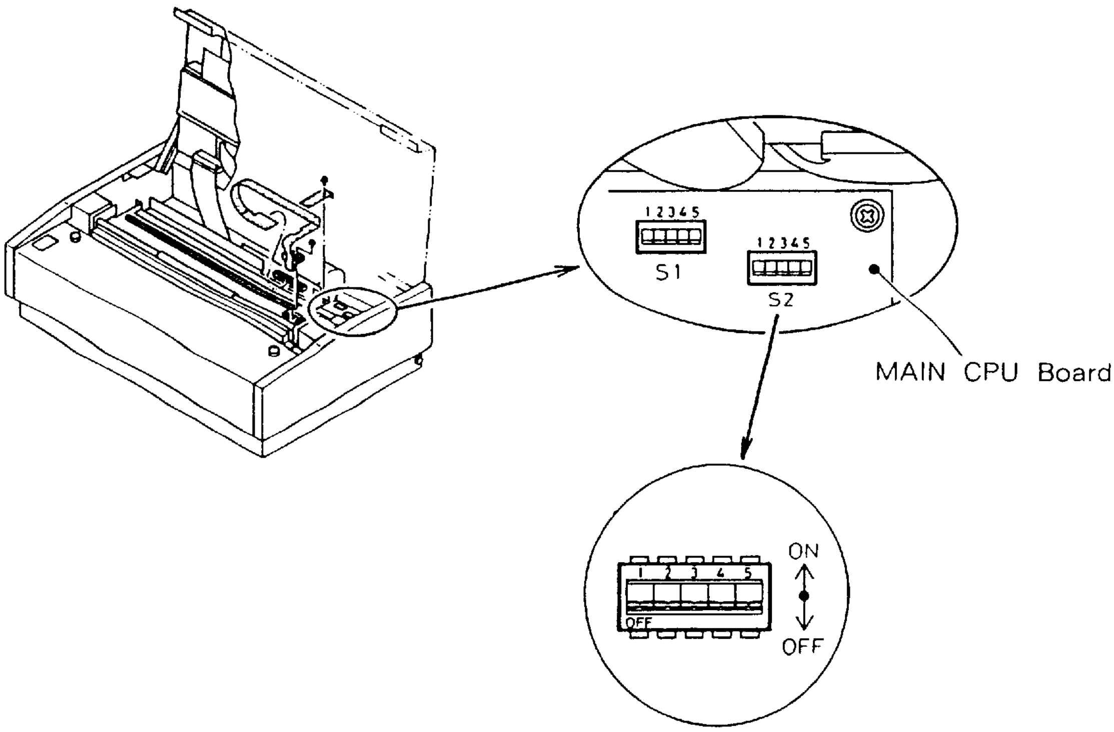
## DIP SWITCH SETTING (for print darkness trimming)

Before reassembling, carefully check the edge connector of the new printer head assembly for a trimming hole. (Be aware that some has no hole.)




Depending on the location of the hole, set the DIP switch S2 on the MAIN CPU board as in the table blow.

| | S2 – 1 | S2 – 2 | S2 – 3 | S2 – 4 | S2 – 5 |
|---|---|---|---|---|---|
| **Hole at ⓐ** | OFF | ON | ON | ON | OFF |
| **Hole at ⓑ** | ON | ON | ON | OFF | OFF |
| **Hole at ⓒ** | ON | ON | ON | ON | OFF |
| **No hole** | OFF | ON | ON | ON | ON |



ASSEMBLING (Refer to the illustrations on pages 2- 5 to 2- 7.)

1. Fix new printer head to the head mount angle [G].

   Ensure that the head and the angle are aligned properly. Never touch the printing surface of the head. If touched, wipe it with a soft cloth and a small amount of isopropyl alcohol. Also do not pull the film cable since it is connected to the printer head only with glue.

2. Fix the head mount angle [G] to the head mount [F] with pan-head screw [E].

3. Insert the edge connector of the film cable [C] to the connector [D], and then lock the connector clutch.

4. Fasten the fold part of the film cable by the clamping plate [B].

   Fix the film cable so that it runs in parallel to the carriage shaft. Also leave some slack in the film cable between the clamping plate and the printer head, so that excessive stress may not be applied to the film cable.

5. Close and fasten the control panel.

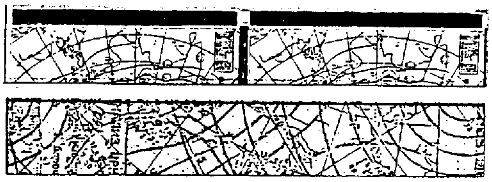
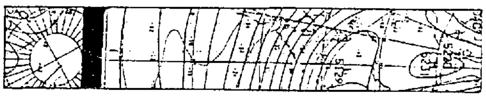
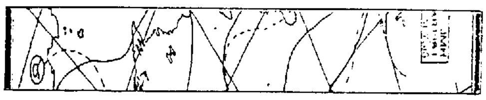
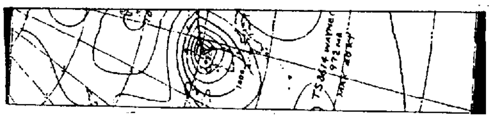
# CHAPTER 3 TROUBLESHOOTING

## OPERATOR TROUBLESHOOTING

Problems with the equipment may be caused not only by a faulty circuit but also by the incoming signal condition, inadequate installation, or even operator error.

The list below shows the typical troubles which may be mistaken as equipment malfunction.

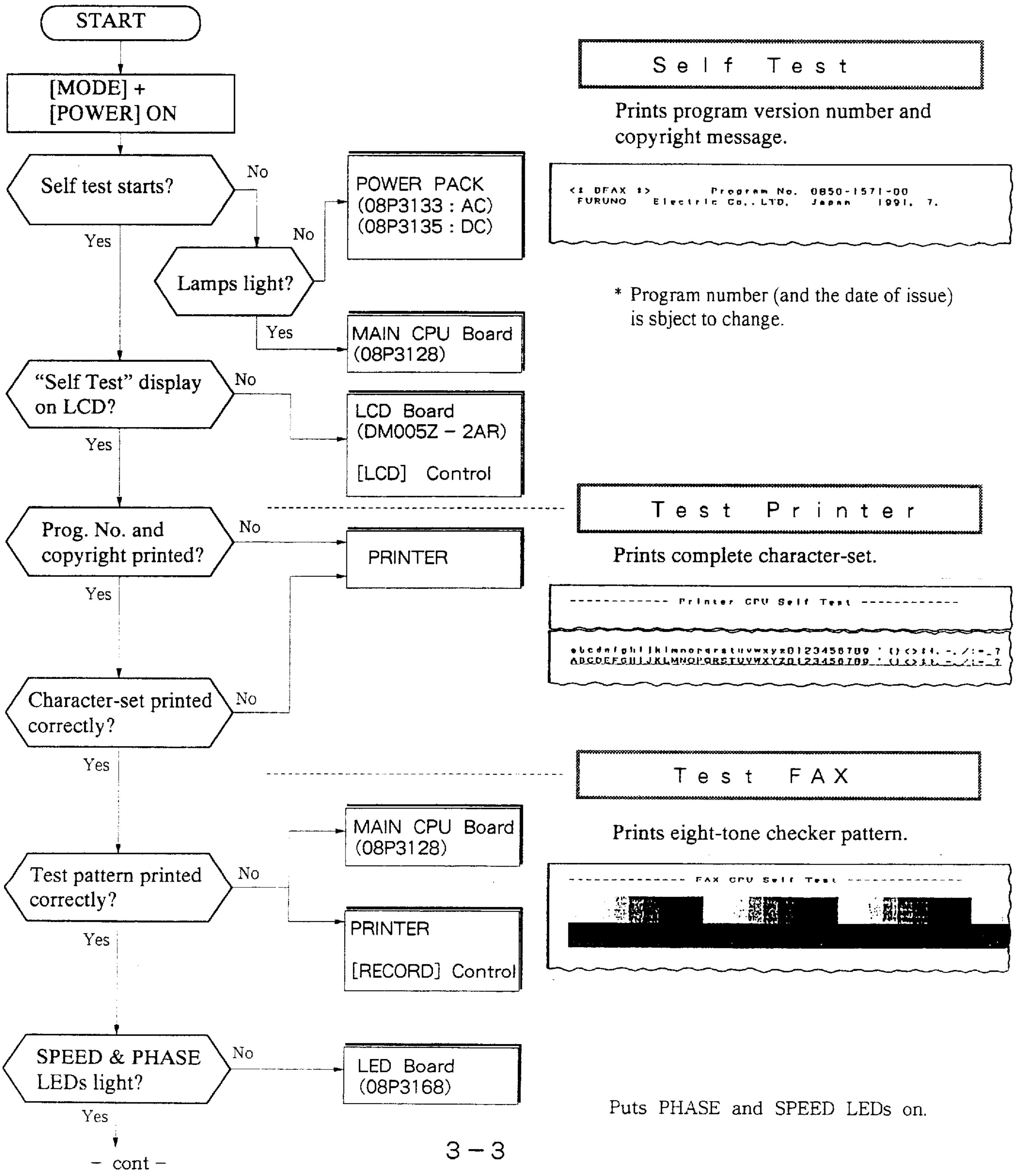
| SYMPTOM | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Power won't come on. (No display nor sound) | 1. Switch at main switchboard is turned off<br>2. Power connector is loose or pulled out.<br>3. Power fuse has blown.<br>4. Battery is fully discharged. (for dc mains) | 1. Turn on the main switch. Plug connector firmly.<br>2. Check mains voltage and polarity first, and put a new fuse.<br>3. If it blows again, call for service.<br>4. Charge or replace battery. |
| Lamp lighs but no or faint display. | 1. Improper LCD contrast setting | 1. Adjust the 〔LCD〕 control. |
| Unreadable charact- er displayed | 1. Backup memory contents are destroyed.<br>2. Keep-alive battery is discharged. | 1. Perform "Cold Start." (See page 1 − 6.)<br>2. Replace the battery. (See page 2 − 3.) |
| No audible sound | 1. [VOLUME] is set too low. | 1. Adjust 〔VOLUME〕 control. |
| Noise heard but no or very weak signal | 1. Antenna connector is loose or pulled out.<br>2. Antenna cable is cut or shorted. | 1. Fasten connector tightly.<br>2. Repair or replace cable. |
| No response to key operation | 1. Internal connector is pulled out. | 1. Check internal cable connections. |
| Can't start recording. | 1. Paper has run out. | 1. Load a new roll of paper. |

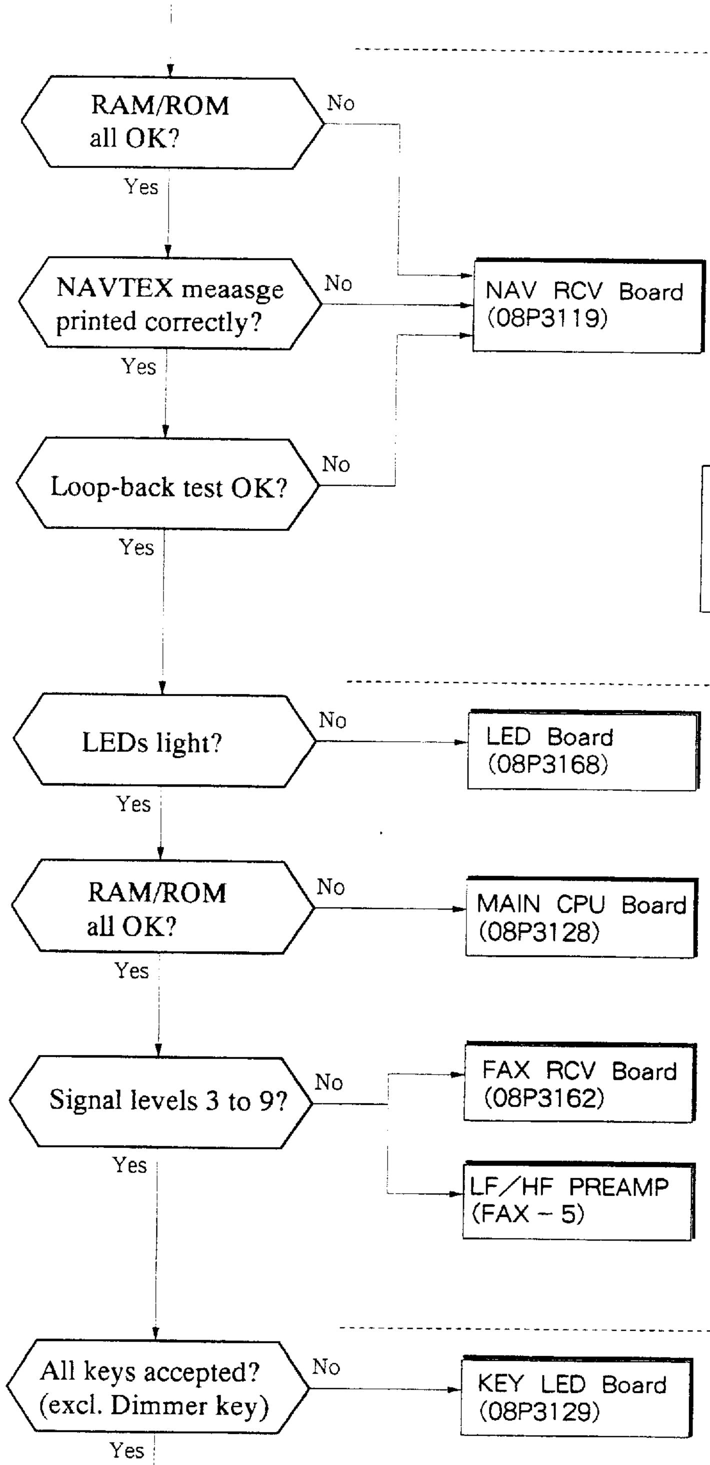
| | | |
|---|---|---|
| Paper won't advance. | 1. Paper is jammed.<br>2. Paper roll is not supported properly. | 1. Clean paper path.<br>2. Load paper correctly.(See page 1 – 24.) |
| Paper feeds but no recording. | 1. Paper is loaded with front-side-back.<br>2. Non-thermal paper is used. | 1. Load paper correctly.<br>2. Use specified thermal paper. |
| Recording is too faint or too dark. | 1. Improper print darkness setting. | 1. Adjust [RECORD] control properly. |
| Multiple or overlapped picture | 1. Speed mismatch<br> | 1. Select correct speed. |
| Split picture (dead sector in the middle) | 1. Out of phase<br> | 1. Set PHASE manually. (See page 1 – 11.) |
| Verticall expanded or compressed picture. | 1. IOC mismatch<br> | 1. Change IOC manually. |
| Skew picture. | 1. SYNC is deviated.<br> | 1. Adjust [SYNC] control. (See page 1 – 11.) |
| Faint or distorted picture | 1. Weak incoming signal<br>2. Receiver detuned | 1. Select another frequency.<br>2. Adjust frequency manually. (See page 1 – 8.) |
| Won't start recording as scheduled. | 1. Remote start mode is selected but no start signal transmitted.<br>2. Improper schedule setting (Two programs ovelapped in time – later schedule will be cancelled.) | 1. Use time start mode if dead sector is transmitted in black.<br>2. Review schedule. |
| Schedule is lost. | 1. Keep-alive battery is discharged. | 1. Replace the battery. |
| Paper turned black | 1. Paper has been store in hot environment or exposed to active gas. | 1. Store paper in dry and cool place. |

# SELF-TEST

To aid the service technician in tracing down a defective circuit block inside the equipment, the FAX-210 is equipped with a self-test facility. As this test is intended for use by service personnel, do not attempt further circuit check inside even if the faulty block can be identified. Prior to starting the self-test, make sure that the mains voltage is within the rated range (10V-40Vdc or 85-132/170-264Vac) and the power fuses are not blown. Check also that the recording paper is loaded correctly.

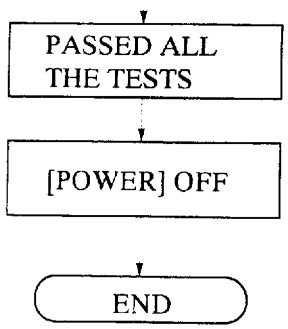
To start the test, turn on the POWER switch while holding down the [MODE] key.






Press the key as LCD prompts.

If the key operation is accepted, a beep is generated and the LCD shows the next key to be pressed.




Test NAVTEX

The test is available only when NAV RCV boaed is incorporated.

- Checks ROM/RAM on NAV RCV board.
- Performs local loop-back test. (The frequency-shift tone can be heard.)

```
------------- NAVTEX Self Test -------------
ROM Test OK
RAM Test OK
ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890
NAVTEX Signal Send and Receive (Local Loop Test)
ZCZC TE01
ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890
NNNN
```

message sent (generated)

message received

Test Master

Checks RAM/ROM on MAIN CPU.
Light all LEDs on front panel.

```
------------- Master CPU Self Test -------------
Internal RAM OK
External RAM OK
ROM          OK
(FAX Receiver Test)
     5000.0 kHz   Sense-Level = 5
    10000.0 kHz   Sense-Level = 3
    15000.0 kHz   Sense-Level = 7
```

Receives standard time signal (WWX, JJY, MSF, ZUO, etc.) at 5, 10 and 15MHz and prints each signal level (0 to 9)
If abnormal, signal level will be 0 to 2.

Push [ENT]

Push [MODE]

All key OK

End of Self Test

# CHAPTER 4 INSTALLATION

## RECORDER UNIT INSTALLATION

## GENERAL MOUNTING CONSIDERATIONS

Proper performance of the recorder unit is directly related to its location. A poorly selected location will not only affect print quality and facsimile signal reception but may also shorten the life of the equipment. When selecting a mounting location keep the following points in mind.

### Water Spray

The recorder unit is designed and constructed to be able to withstand the humidity and corrosive atmosphere common in small vessels, but it is not designed to be used outside, directly exposed to the environment! Salt water spray will most assuredly cause damage to the sensitive components inside.

*FURUNO will assume no responsibility for the damage caused by exposure to water spray.*

### Mechanical Shock and Vibration

The recorder itself is constructed to withstand minor shocks and engine vibrations, but excessive and continued shock can shorten the life of the precision printer mechanism. Shock may also degrade the print quality due to uneven contact between the printer head and the recording paper.

### Heat Accumulation

This unit consumes very little power, so there is no need for forced air ventilation. However, it is recommended to provide at least some space around the recorder unit to allow circulation of cooling air.

Even though the LCD (Liquid Crystal Display) is quite legible even in direct sunlight, it is recommended to keep the recorder unit out of direct sunlight or at least shaded because of heat that can build up inside the cabinet. Excessive heat can darken the thermal recording paper.

### Onboard Noise

This unit contains a very sensitive receiver. To avoid mutual interference with other radio or navigational equipment, do not install the recorder near an SSB/VHF/CB radiotelephone, direction finder or Loran receiver.

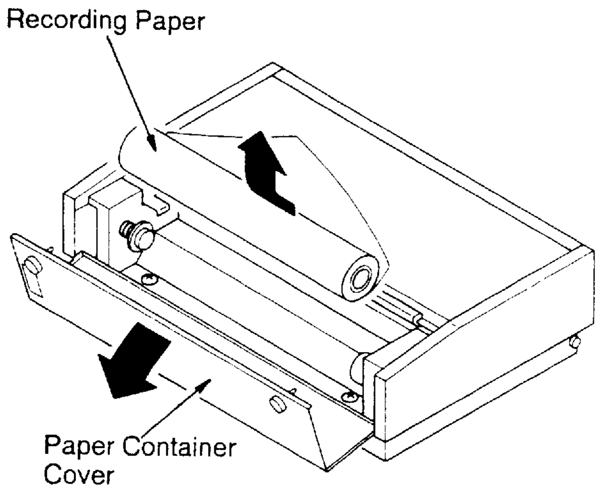
# MOUNTING

The recorder unit can be mounted on either a bulkhead or tabletop. Make sure the selected location is strong enough to support the unit against possible vibration and shock. If necessary, appropriate reinforcement measures should be made on the mounting area.

During unattended operation of the equipment, a long recorded paper may hang down from the recorder. To prevent the paper from running skew or being jammed on the way, level the recorder horizontally and keep the paper path clear so that the paper can run down smoothly. Also remember to leave some space below the paper container so that the container cover can flip down.

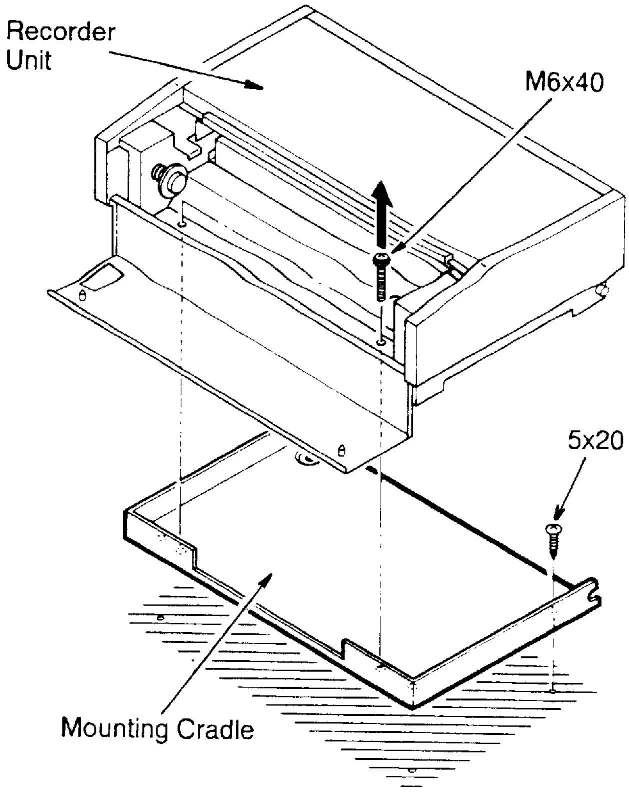
**[ Procedure ]**

1. Loosen the two thumb screws securing the paper container cover; then remove the recording paper.




2. Loosen the two screws securing the recorder unit onto the mounting cradle; then take off the recorder unit.

3. Fix the mounting cradle to the chosen location with four tapping screws supplied ( $\phi$ 5x20).

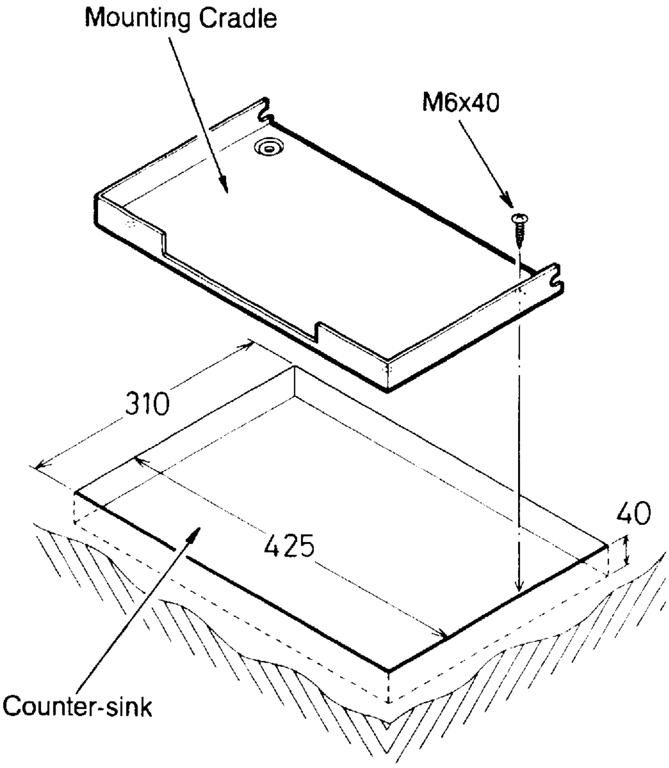



4. Lay the recorder unit atop the mounting cradle, and then fasten with two screws again.

## MOUNTING ON COUNTER-SINK

If required the mounting cradle can be placed in counter-sink to reduce the height of recorder from the surface of bulkhead or table. The dimensions of counter-sink are given in the illustration to the right.

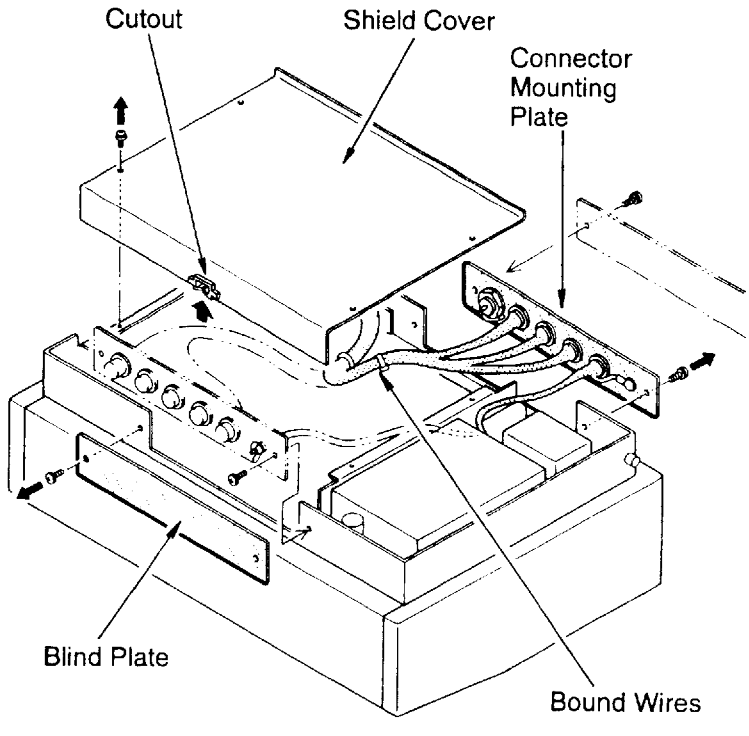
Remember to fix the mounting cradle leaving some space for the connectors and cables.




## MOVING CONNECTORS FROM REAR TO FRONT

When the unit is delivered from the factory, the connectors are placed on its rear side. If it is easier to make connections from the front side due to cable layout, the connectors can be moved to the front. Remember to lay cables neatly so that the paper container cover can flip down.

1. Place the recorder unit upside down after removing the mounting cradle. (See the illustrations on preceding page.)
2. Remove the blind plate on the front.
3. Remove the shield cover.
4. Unfasten the connector mounting plate on the rear, and then fasten it onto the front side where the blind plate were fitted.
5. Passing the bound wires through the cutout, secure the shield cover as it was.
6. Secure the blind plate on the rear panel.



# ANTENNA INSTALLATION

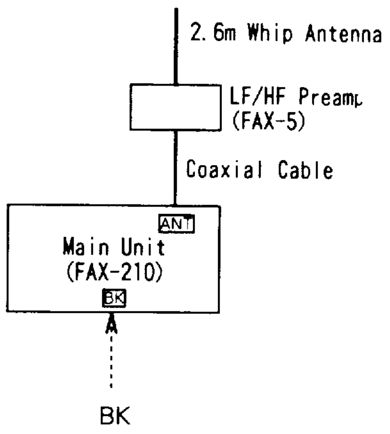
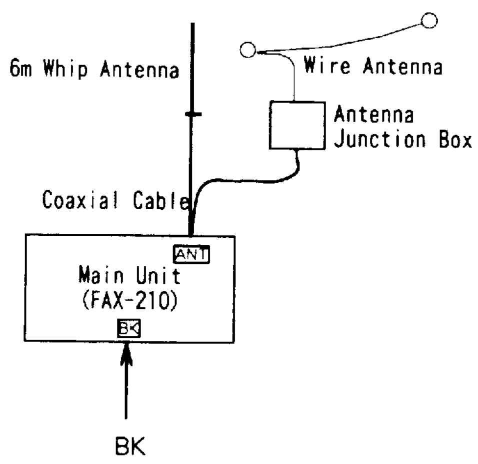
Performance of this receiver, especially in weak signal areas, is directly related to the antenna installation. In general, the antenna should be installed as high as possible on the vessel, free from the influence of nearby antennas, rigging and masts.

## VARIATION OF ANTENNA INSTALLATION

The antenna configuration varies with the following conditions. Decide which one is suitable for your boat.

- o Whether or not you need NAVTEX reception. (Continuous reception needed for NAVTEX; non-breakable)
- o Whether or not you have sufficient space for wire antenna. (Wire antenna or Preamp + whip)
- o Whether or not you have high power LF/HF transmitter on board. (Need of break-in connection with the transmitter)

No NAVTEX Reception (FAX only)

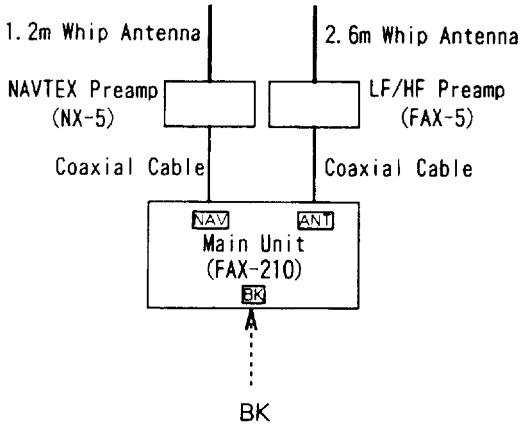
| With Preamp Unit | Without Preamp Unit |
|---|---|
|  |  |
| o It is ideal to connect BK line if LF/HF transmitter exists on board<br>o Set switch S1 on TB board to "ACTIVE". (See page 4 – 13.) | o Surely connect BK line if LF/HF transmitter exists on board.<br>o Set switch S1 on TB board to "WIRE". (See page 4 – 13.) |

NAVTEX Reception Mandatory (FAX + NAVTEX)

The NAVTEX provides its intended performance when it is received continuously. Unlike facsimile reception, even a short break can destroy reception of one complete NAVTEX message. If BK connection is mandatory, install a separate NAVTEX Preamp Unit (NX-5).

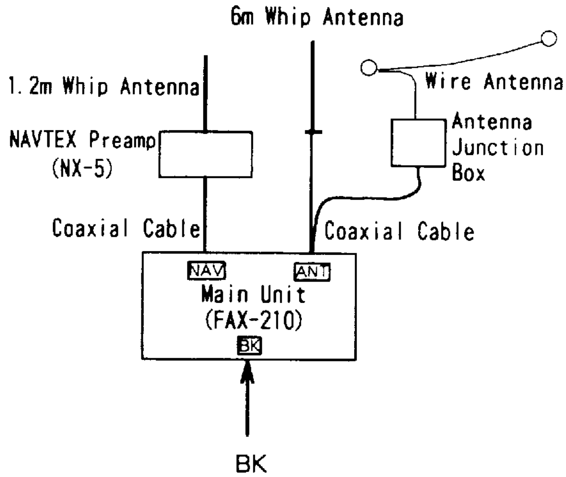
## Separate Antenna for FAX & NAVTEX

### With FAX Preamp Unit




- It is ideal to connect BK line if LF/HF transmitter exists on board.
- Set switch S1 on TB board to "ACTIVE". (See page 4 – 13.)
- Set switch S2 on TB board to "NX ON". (See page 4 – 13.)

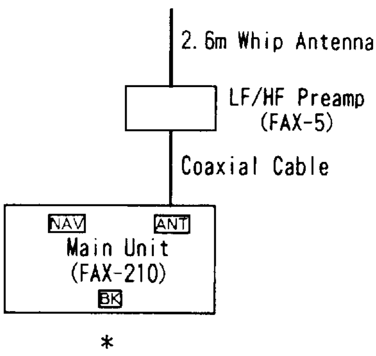
### Without FAX Preamp Unit




- Surely connect BK line if LF/HF transmitter exists on board.
- Set switch S1 on TB board to "WIRE". (See page 4 – 13.)
- Set switch S2 on TB board to "NX ON". (See page 4 – 13.)

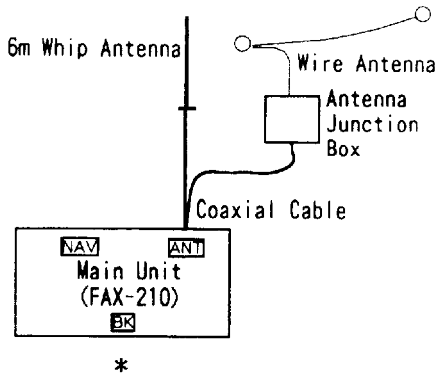
## Common Antenna for FAX & NAVTEX

### With Preamp Unit




- No BK line should be connected. Don't use this configuration if LF/HF transmitter exists on board.
- Set switch S1 on TB board to "ACTIVE". (See page 4 – 13.)
- Set switch S2 on TB board to "NX OFF". (See page 4 – 13.)

### Without Preamp Unit




- No BK line should be connected. Don't use this configuration if LF/HF transmitter exists on board.
- Set switch S1 on TB board to "WIRE". (See page 4 – 13.)
- Set switch S2 on TB board to "NX OFF". (See page 4 – 13.)

## PASSIVE ANTENNA (Wire Antenna)

If the vessel is large enough, install a long-wire or whip antenna of 6 meters or longer. If the NAVTEX receiver board (option) is not incorporated, it is possible to share the antenna with an all wave receiver by using an Antenna Multicoupler. Do not share the antenna with the transmitter.

## ACTIVE ANTENNA (Preamp Unit; option)

If your vessel is small and you can not provide space for such a long antenna, it is recommended to install the preamp unit FAX-5 (or NX-5) and whip antenna of 2.6 meter (or 1.2 meter), respectively. For 1.2 meter whip antenna, the taping is necessary (see page 4-17).

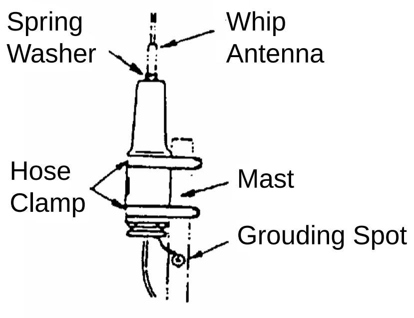
1. Clamp the Preamp Unit tightly on a stub mast with to stainless steel hose clamps. (Hose clamps must be arranged locally.)

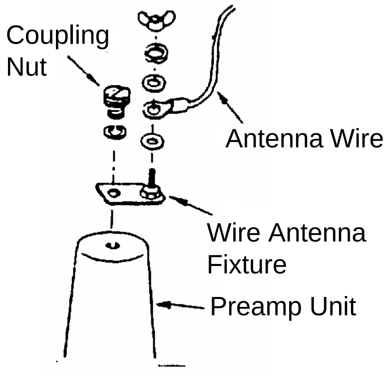
2. Screw the whip antenna tightly onto the Preamp Unit.

3. Secure the earth lead of the Preamp Unit to the nearest grounding spot.

4. Waterproof the antenna junction and other exposed metallic parts with sealing compound (silicone rubber, putty, etc).

Instead of using the whip antenna, an antenna wire of 2 to 3 meter long may be connected as shown right.



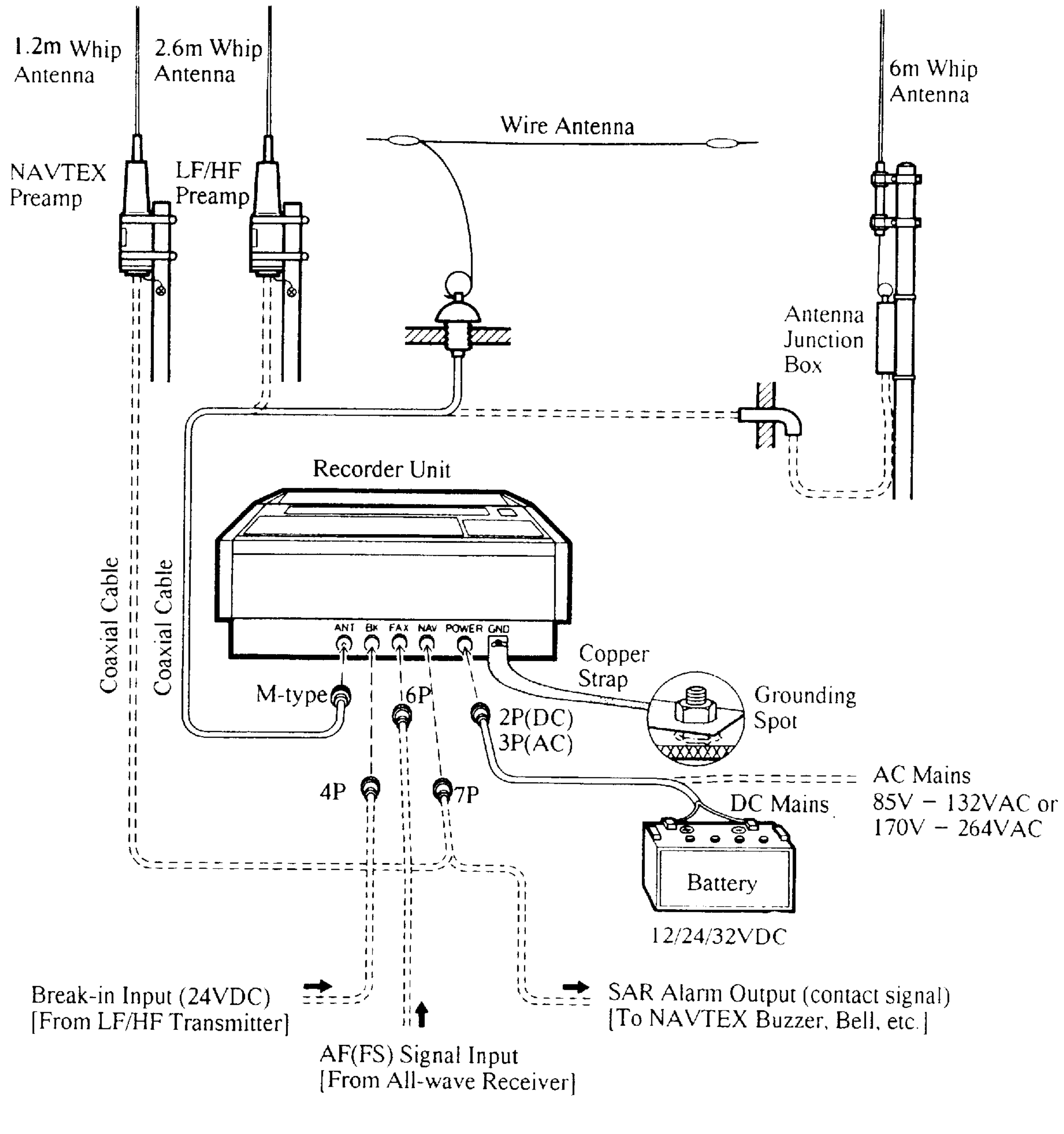




**NOTE**

*If the Preamp Unit is installed, change the settings of switches (S1/S2) inside the recorder unit to supply 9Vdc to the Preamp Unit. Refer to page 4-13.*
*If receiver sensitivity is insufficient on preamp unit-equipped sets, ground the preamp unit referring to page C-1.*

# CABLE CONNECTIONS

All the connectors are arranged on the rear panel of the recorder. Referring to the following descriptions and the interconnection diagram (page S- 1), connect the cables to the recorder.



# POWER CONNECTOR (POWER)

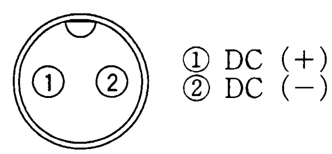
There are two types of FAX-210 depending on the ship's mains voltages; ac operating set or dc operating set.

The dc set has 2P Power connector and accepts any dc mains voltage between 10V to 40Vdc. Be careful of mains polarity when connecting the power.

The ac set has 3P Power connector and accepts either 86V to 132Vac or on 170V to 264Vac depending on the internal wiring setting. (Refer to page 4-12 for setting.)

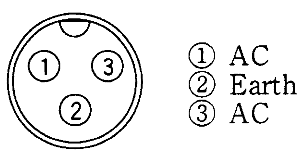
The pin configurations for the Power connectors are shown below.

DC POWER Connector




(Solder-side of Plug)

AC POWER Connector



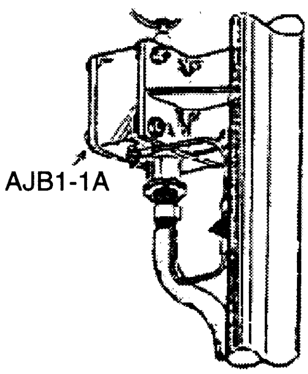

(Solder-side of Plug)

# ANTENNA CONNECTOR (ANT)

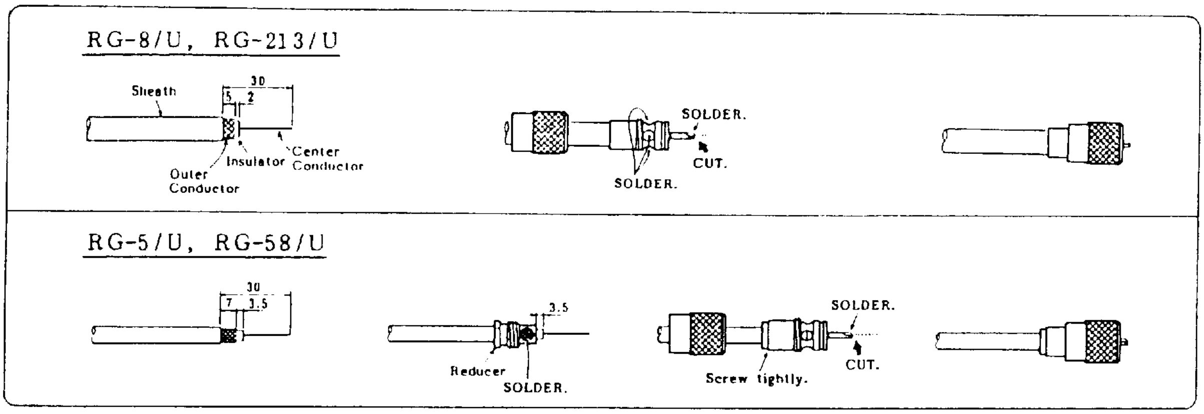
Antenna for facsimile (or facsimile/NAVTEX) reception is connected to the ANT coaxial connector.

If the Preamp Unit (FAX-5) is installed, a coaxial plug is already connected at the end of 15m feeder. Connect the plug firmly to the female connector at the rear of the recorder.

If a wire and/or whip antenna is installed, a antenna junction box (e.g., Furuno type AJB1-1A) must be installed since connection with the FAX-210 must be made with coaxial cable (RG-10/U or equivalent, 50 or 75ohm).



To put a coaxial plug on the cable end referring to the illustrations below. Depending on the cable size, use an appropriate reducer, provided as standard.




# BREAK-IN CONNECTOR (BK)

In some cases where the FAX-210 is installed on a boat equipped with a high power MF/HF transmitter (200W or more), the high power RF induction from the transmitter can cause damage to the front-end of FAX-210.

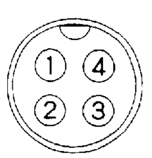
If the Preamp Unit (active antenna) is installed, there is no need of protection against an RF induction, since the unit is designed to withstand against a 30Vrms antenna input for at least 15 minutes.

However, if a long-wire antenna and/or a whip antenna is directly connected to the FAX-210, high power RF induction may well damage its receiver front-end.

To protect the receiver, a relay is provided in FAX-210 so that the antenna is disconnected from the receiver circuit and connected to ground when the transmitter is keyed.

As necessary, feed BK signal (24Vdc) of transmitter to the BK connector of FAX-210. The pin configuration of the BK connector is shown to the right.

BK Connector




① BK24V (Don't care
② BK24V the polarity.)
③ No connection
④ No connection

(Solder-side of Plug)

**NOTE**

*The NAVTEX provides its intended performance when it is received continuously. Unlike facsimile reception, even a short break can destroy reception of one complete NAVTEX message.*

Separate NAVTEX antenna input terminal is provided inside the NAV connector. If NAVTEX reception is mandatory for your navigation, you should install the Preamp Unit (NX-5) to this terminal. Make sure to place the antenna far apart from transmitting antenna.

## GROUND TERMINAL (GND)

Fix one end of the copper strap (20mm wide, supplied as a installation materials) to the grounding terminal at the rear panel of the recorder unit, and connect the other end to the nearest efficient grounding spot on the vessel. It is best to find a good grounding spot while receiving a facsimile signal.

> **⚠ CAUTION**
>
> **Ground the equipment to prevent electrical shock and mutual interference.**
>
> Ungrounded equipment can give off or receive electromagnetic interference or cause electrical shock.

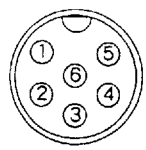
## FAX CONNECTOR (FAX)

The FAX connector has the following input/output pins for facsimile audio signals (frequency-shift tone).

| Pin No. | Signal Name | Description | Conditions | Connected to : |
|---|---|---|---|---|
| 1 | FAX OUT | AF signal output from internal FAX receiver | Level : 0dBm/600 Ω (Use shielded wire.) | oExternal FAX recorder (very rare case)<br>oLINE IN terminal of DAT |
| 2 | 0V | | | |
| 3 | FAX IN | AF signal input to FAX-210 recorder | Level : 0dBm/600 Ω (Use shielded wire.) | oLINE OUT terminal of all-wave receiver<br>oLINE OUT terminal of DAT |
| 4 | 0V | | | |
| 5・6 | NC | Not used | | |

Use shielded wire for audio signal input/output.

FAX Connector




(Solder-side of Plug)

① FAX AF OUT
② 0V
③ FAX AF IN
④ 0V
⑤ No connection
⑥ No connection

### FAX AF Signal Input

To record facsimile signal received on an external all wave receiver, feed its audio output (0 dBm/600 ohms) to pins #3 (core) and #4 (shield) of the FAX connector.

### Record/Play- back System of Facsimile Pictures

For demonstration or educational purposes, the facsimile pictures can be recorded and played back by using a DAT (Digital Audio Taperecorder). Connect its recording cable to pins #1 (core) and #2 (shield) of FAX connector, and the play-back cable to pins #3 (core) and #4 (shield).

## NAVTEX CONNECTOR

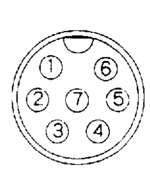
If the unit contains the NAVTEX receiver board, the following signals may be input or output through the NAV connector.

| Pin No. | Signal Name | Description | Conditions | Connected to : |
|---|---|---|---|---|
| 1 | NX5 ANT | NAVTEX antenna input | Impedance : 50 Ω (Use coaxial cable.) | Preamp Unit (NX - 5) |
| 2 | 0V | | | |
| 3 | ALARM | Alarm output for SAR message reception | Contact signal [Capacity : 1Adc/20W] | Buzzer, bell, etc. (External alarm device) Distress message controller |
| 4 | ALARM | | | |
| 5 | NAV OUT | NAVTEX AF output | Level : 0dBm/600 Ω (Use shielded wire.) Connect jumper between 5 - 6 if no AF signal is used. | LINE IN terminal of DAT |
| 6 | NAV IN | NAVTEX AF input | | LINE OUT terminal of DAT |
| 7 | 0V | Common GND of NAV AF | | (shields of the above two) |

## Navtex Antenna Input

If the separate Preamp (NX-5) is installed for NAVTEX reception alone, connect the coaxial cable from the Preamp to pins #1 (center conductor) and #2 (outer conductor) of NAV connector. (Refer to page 4- 13 to supply power to the Preamp.) If a common antenna is used for facsimile and NAVTEX, leave these pins open.

NAV Connector




(Solder-side of Plug)

① NX5 ANT
② 0V
③ ALARM (contact sig
④ ALARM
⑤ NAV AF OUT
⑥ NAV AF IN
⑦ 0V (AF COMMON)

## SAR Alarm Output

Contact signal, which makes in the event of Search And Rescue message reception, is output to pins #3 and #4 of the NAV connector. If it is necessary to signal the situation in a louder sound level than the built-in speaker or by some other means, such as a flashing light or a prerecorded tape, use this contact signal. The relay contact is capable of handling a 1A/20W load.

To maintain good reception, the device connected to the alarm terminal should not generate radio noise. (A poor quality electric buzzer may cause heavy radio noise due to arcing at its contact.)

## Navtex AF Signal Input

To record NAVTEX signal received on an external receiver, feed its audio output (0 dBm/600 ohms) to pins #5 (core) and #7 (shield) of the NAV connector. (It is not practical to use external receiver, since NAVTEX requires continuous reception.)

## Record/Play-back System of NAVTEX Messages

For demonstration or educational purposes, NAVTEX messages can be recorded and played back by using a DAT (Digital Audio Taperecorder). Connect its recording cable to pins #5 (core) and #7 (shield) of NAV connector, and the play-back cable to pins #6 (core) and #7 (shield).

**CAUTION**

*When no external equipment is connected, do not forget to connect loop-back link between pins #5 and #6 of NAV connector. Otherwise, NAVTEX messages will not be printed.*

# PRESETS AFTER INSTALLATION

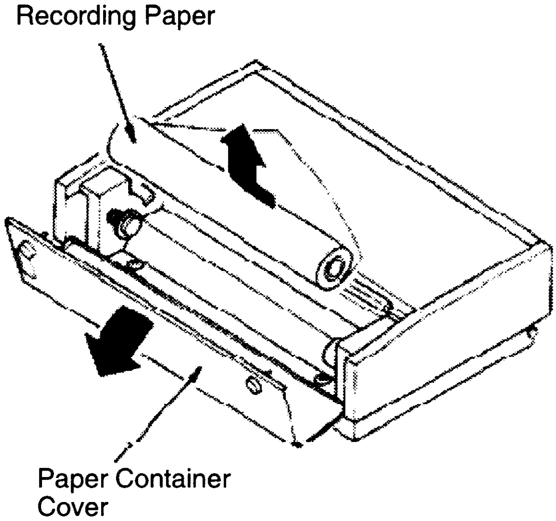
## VOLTAGE SELECTION OF AC POWER PACK

The ac power pack in the FAX-210 accepts either 86V to 132Vac or 170V to 264Vac by the internal wiring setting. (dual-range universal)

Depending on the ship's mains voltage, set the voltage selection switch on the power pack.

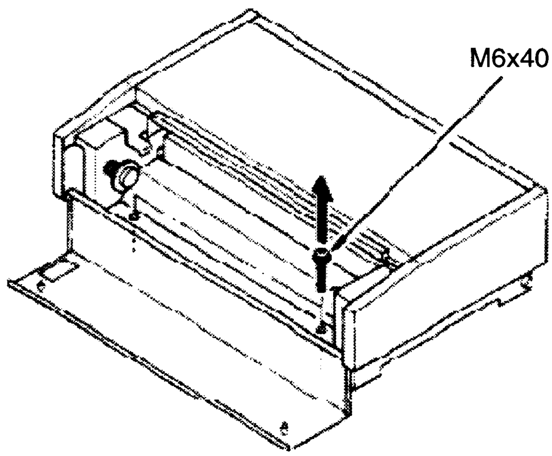
**[ Procedure ]**

1. Open the paper container cover and remove the paper roll.

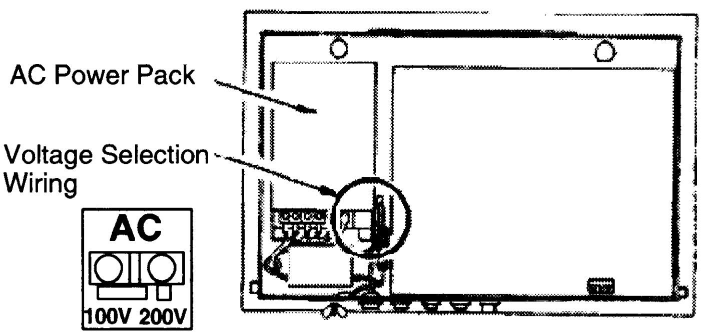



2. Detach the recorder unit from the mounting cradle after loosen two M6x40 screws.

3. Place the recorder upside down and find the slide switch on the power pack.




4. Set the wiring to "100V" (86V-132V) or to "200V" (170V-264V) depending on the ship's mains voltage.

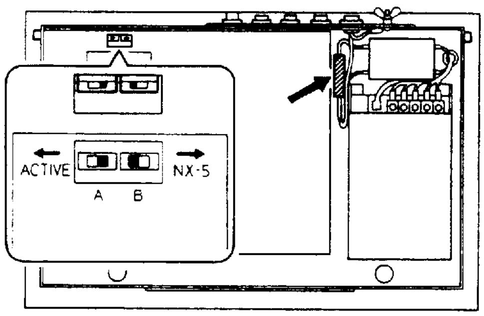


# PRESET FOR PREAMP UNIT

The Preamp Unit (FAX-5/NX-5) requires external power supply through the coaxial cable. Depending on the antenna configuration, set the switches inside the recorder unit as prescribed below.

## [ Procedure ]

1. Detach the recorder unit from the mounting cradle. Refer to page 4- 12.




2. Find the miniature slide switches S1(A) and S2(B) in the square cutout on the bottom shield cover.

3. Set the switches depending on the antenna configuration.

Setting of S1 (A)

| | |
|---|---|
| FAX-5 used | 「ACTIVE」 |
| FAX-5 unused | 「WIRE」 |

Setting of S2 (B)

| | |
|---|---|
| NX-5 used | 「NX ON」 |
| NX-5 unused | 「NX OFF」 |

**CAUTION**

*9Vdc will be supplied to the antenna terminal if S1 (A) is set to "ACTIVE" or S2(B) is set to "NX ON". Do not make shortcircuit at the antenna terminals.*

# SELECTION OF ASPECT RATIO FOR FAX RECORDING

By the preset switch in the recorder unit, aspect ratio for facsimile recording can be changed in two steps; V:H=1:1 or V:H=1.5:1. For weather chart recording, aspect ratio of 1:1 is desirable to avoid picture distortion and to reduce paper consumption. For recording text oriented facsimile information, however, aspect ratio of 1.5:1 may be useful to obtain large easy-to-read letters. (Aspect ratio is set to 1:1 when delivered from the factory.)

Note that the text printout size of NAVTEX messages and other status messages is not affected by this aspect ratio setting.

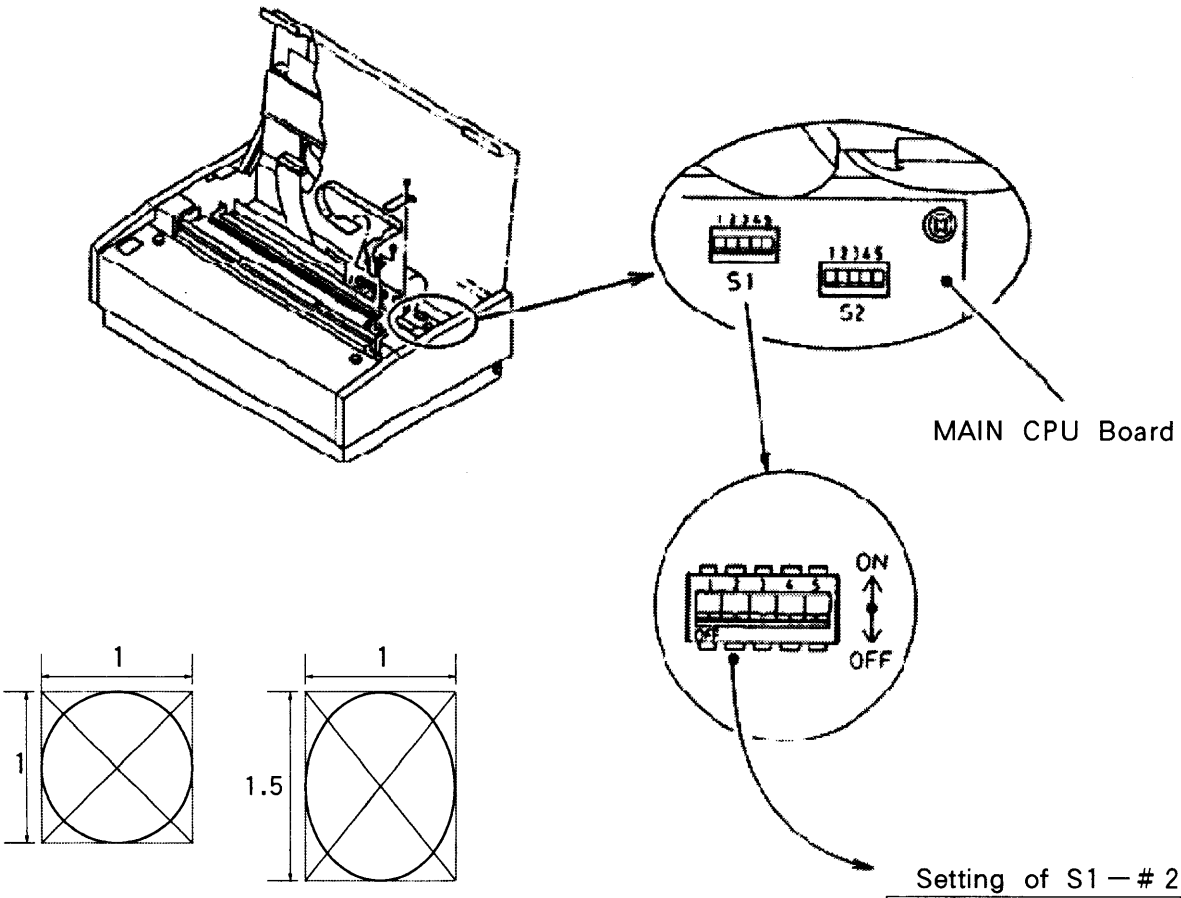
### [ Procedure ]

1. Flip up the control panel after loosening two screws.

2. Find the 5-segment DIP switch S1 on the MAIN CPU board.

3. Set the second switch of S1 to ON (1.5:1) or OFF (1:1) depending on the desired aspect ratio.

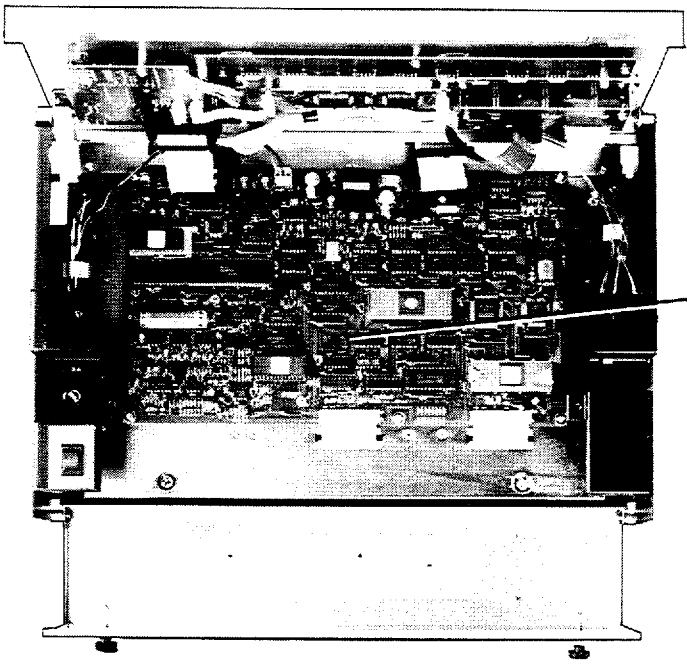
4. Fasten the control panel as it was.



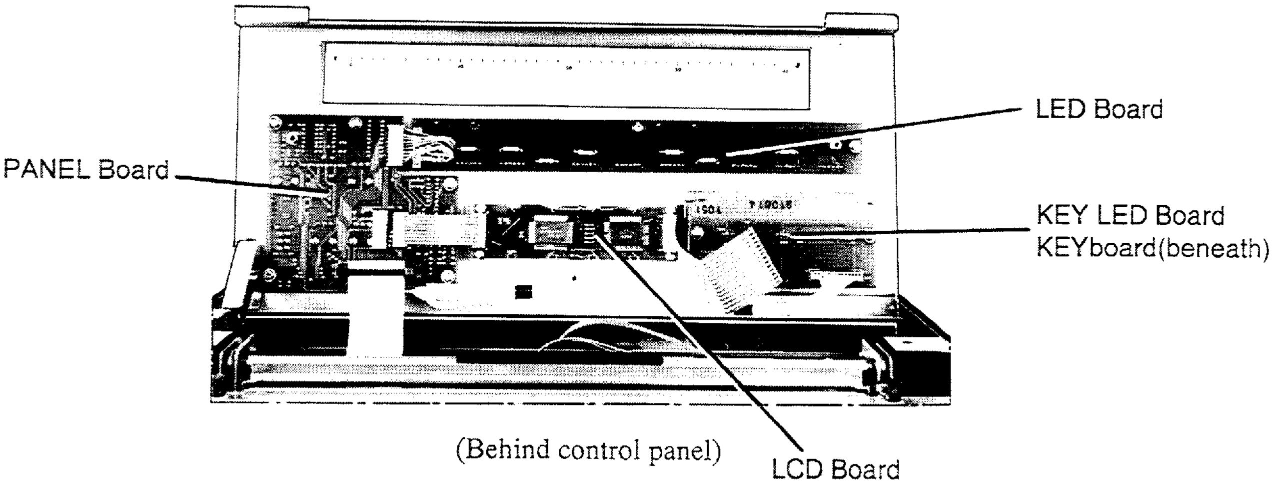

Setting of S1 — # 2

| | |
|---|---|
| ON | V : H = 1.5 : 1 |
| OFF | V : H = 1 : 1 |

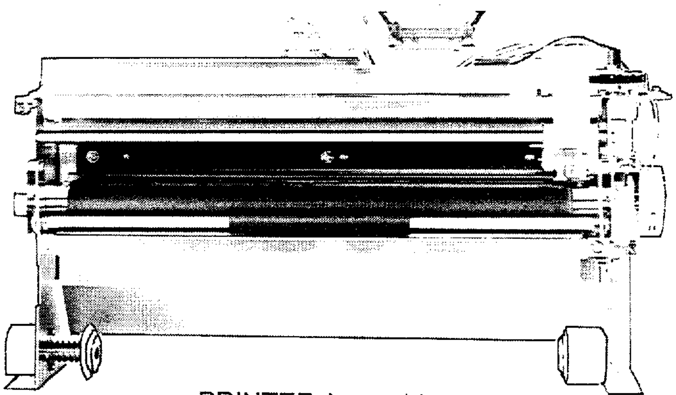
# LOCATION OF CIRCUIT BOARDS



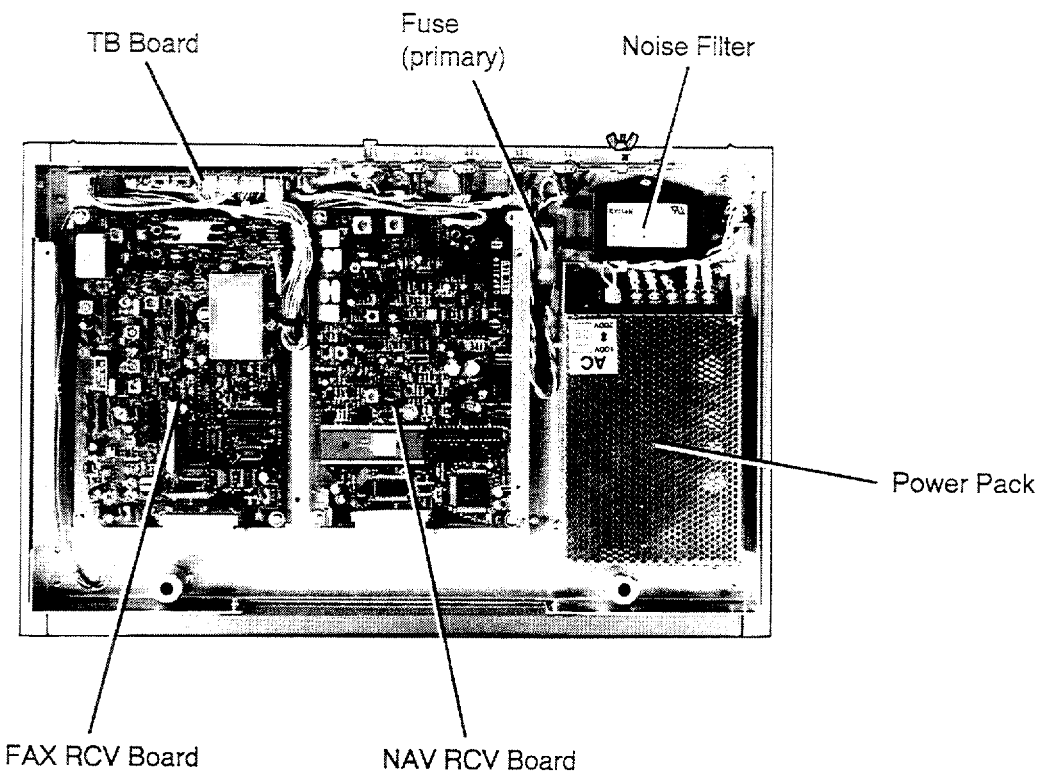

(With control panel open and printer removed)




(Behind control panel)



PRINTER Assembly




(With mounting cradle removed)

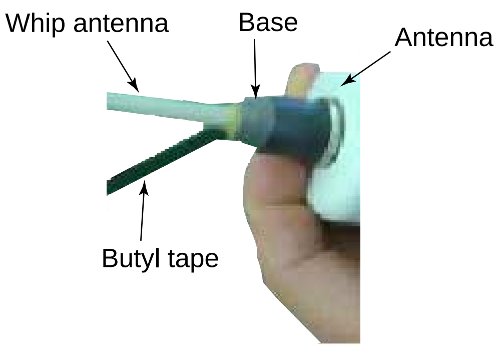
# TAPING WHIP ANTENNA

After inserting the whip antenna to the antenna base, tape the antenna base and whip antenna with self-vulcanizing tape and vinyl tape to reinforce the whip antenna.

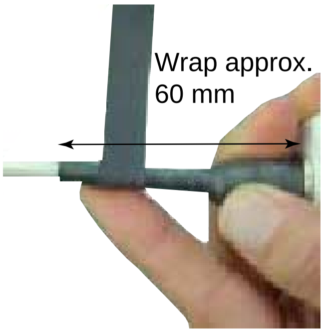
1. Wrap the antenna junction point with butyl 15 tape or the equivalent.

   How to wrap

   1) Pull the tape to be about two times in length and wind it up, overlapping by 1/2 the width of the tape.
   2) Wrap from bottom to top, i.e., from right to left as in the picture below.



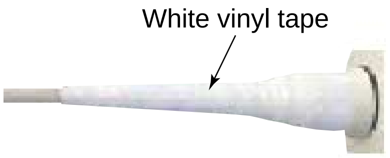

   3) Wrap the tape from the base to a point about 60 mm, and then back to the base.
      Keep tension on edge of tape, using finger to hold tape. Then, squeeze edges of tape with thumb and index finger.




2. Completely cover the butyl rubber tape with white vinyl tape, wrapping from the base to the last wind of butyl tape and then back to the base.

   How to wrap

   1) Being careful not to pull the tape too tightly, wind tape, overlaping by approx. 1/3 of tape width.
   2) Squeeze edges of tape with thumb and index finger.



# APPENDIX-A PRINCIPLE OF FACSIMILE AND NAVTEX SYSTEMS

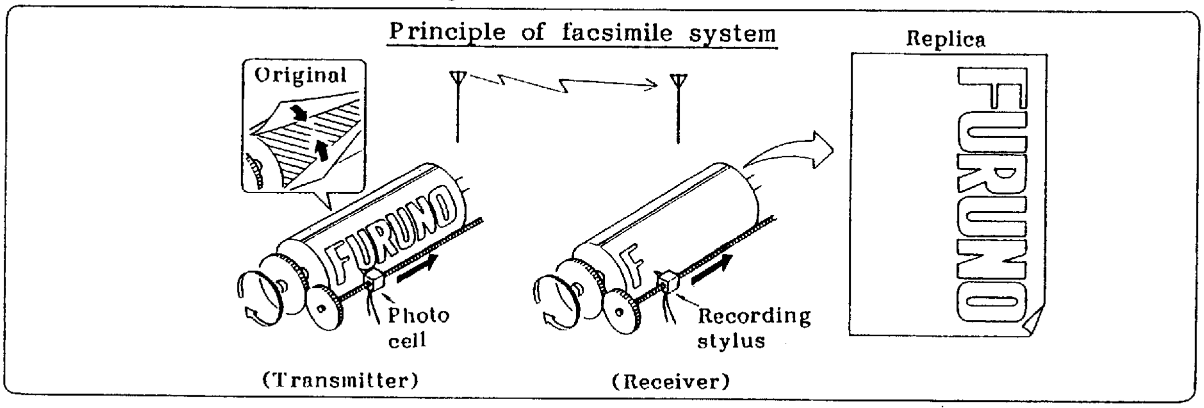
## HOW A FACSIMILE SYSTEM WORKS

The picture on a TV screen is composed of many fine horizontal lines. This is because of its transmission system that a frame of picture is sliced into narrow strips and sent piece by piece serially to a receiving station, where the strips are reassembled to reconstruct the original picture. As the frequency band assigned for TV broadcasting is comparatively wide, 25 or 30 frames of pictures can be sent in a second.

The radio facsimile uses much the same principle as the TV broadcasting system, but in a lower frequency and in a narrower bandwidth. Due to this limitation, it takes several minutes for the facsimile transmitter to send a frame of picture.

Though the transmission speed is slower than that of the TV, the facsimile signals in LF or HF bands propagate at much greater distances than the normal TV signal.

## RADIO FACSIMILE SYSTEM




At the facsimile transmitter, the original picture is fitted on a drum rotating at 60, 90, 120 or 240 rpm, and a photo cell mounted on the threaded shaft moves slowly along the drum. The photo cell, focused on a point on the drum, converts black and white information into an electrical signal. As the drum rotates and the photo cell moves, the picture information is sliced into narrow pieces and a series of black and white signals are obtained. In the transmitter, the black and white signals are converted into 1500Hz (black) and 2300Hz (white) frequency shifts and modulates the radio frequency assigned for the station. (The black and white frequencies will be reversed in the LSB transmission.)

At the receiver, the frequency shift (FS) signals are converted into a black and white recording signal and the marks are printed on the recording paper.

To obtain an exact copy of the original picture at the receiver, the rotating speed and phasing of the transmitter and receiver must agree with each other, i.e., synchronization in rotation and synchronization in position.

To achieve automatic synchronization, most transmitters transmit a phasing signal before sending pictures. The phasing signal is a continuous black signal with narrow white gaps at the seam of the original picture. In the automatic facsimile receiver, the repetition rate and position of the white gaps are detected to determine rotating speed and phase.

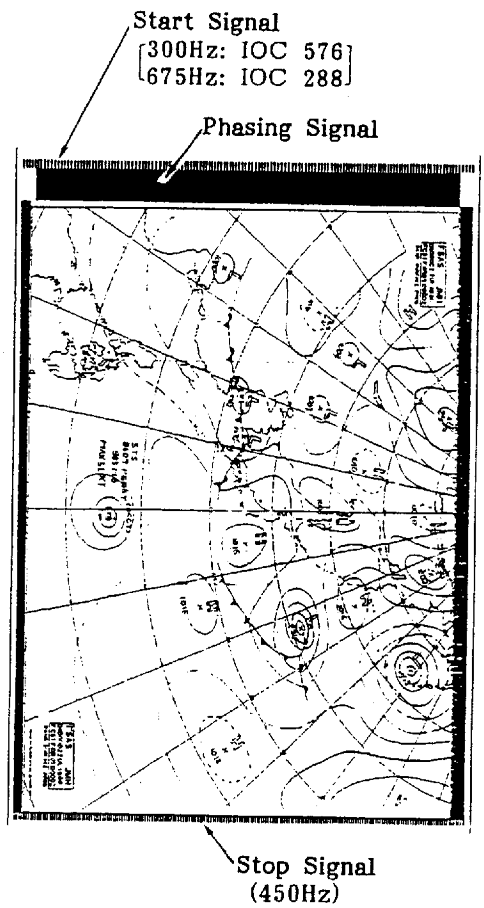
In addition to the speed and phase synchronization, the line density with respect to the picture width for the transmitter and receiver must agree with each other to obtain an exact copy of the original picture. Otherwise the reproduced picture may be expanded or compressed vertically. To maintain international compatibility, two line density standards are assigned by WMO; high density - IOC 576 and low density - IOC 288.

IOC stands for Index Of Cooperation, and indicates the horizontal/vertical ratio of a picture. In practice, it is the product of line density and drum diameter.

$$\text{IOC} = (\text{line density}) \times (\text{drum diameter})$$

or

$$\text{IOC} = \frac{(\text{line density}) \times (\text{picture width})}{\pi}$$




To enable fully automatic start and stop of picture recording, most facsimile transmitters send remote start and remote stop signals before and after transmission of pictures. The remote signals appear as black/white stripes as shown right.

For identification of start, stop and line density of picture transmission, three frequencies are used as remote signals. The start signal is either 300Hz or 675Hz to indicate the line density of the forthcoming picture. The remote stop signal is always 450Hz.

# RECORDING SYSTEM ON THE FAX-210

The recording system used in FAX-210 is somewhat different from conventional facsimile recorders.

The received signal is first stored and assembled in the memory according to the given speed, phase and IOC. It is then printed out by the parallel printer head when a certain amount of picture information is accumulated in the memory. For IOC 576, one piece of the picture, corresponding to approximately 30 scan lines of incoming signal, is printed at a time.

Picture recording is performed by controlling the temperature of each thermal element rapidly while moving the parallel head on the recording paper. Depending on the temperature, chemical material on the paper changes the color of the paper and reproduces picture.

# HOW NAVTEX WORKS

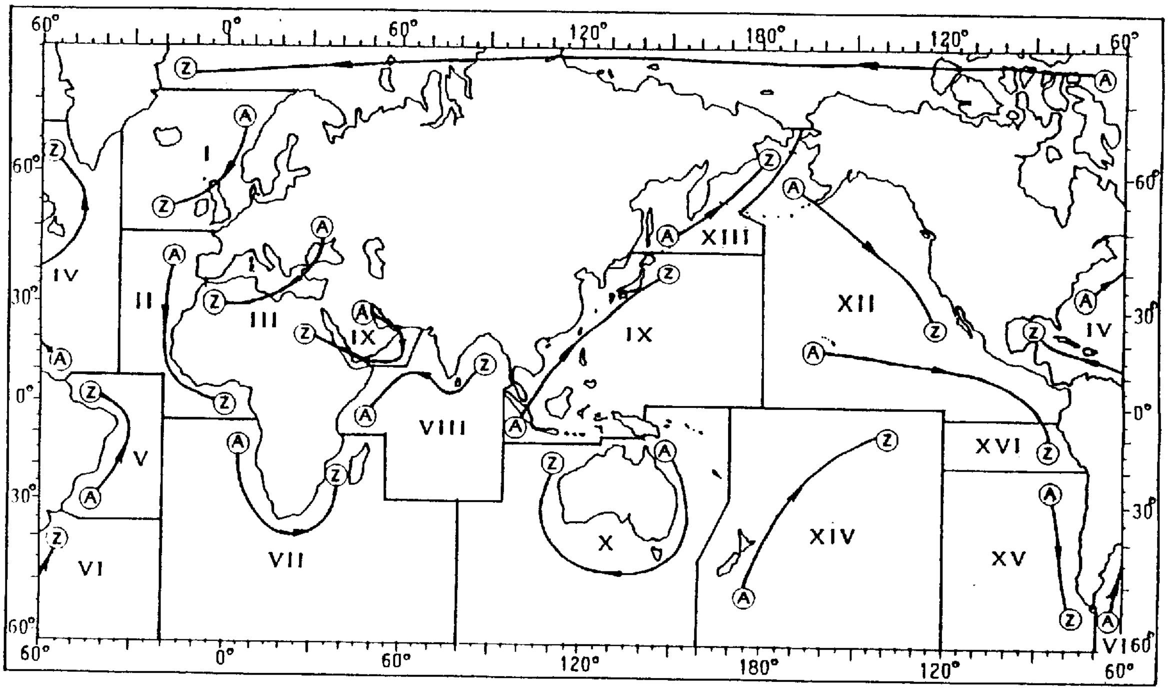
There are many types of navigational and meteorological information available on radio such as NAVAREA, HYDROPAC, etc. However, these systems rely heavily upon the operator's experience and skill in tuning the radio and interpreting messages. In addition, constant monitoring to pick up wanted information among a vast volume of messages is not practical with a limited radio staff.

To provide all mariners with up-to-the-minute information automatically, the NAVTEX system was developed.

NAVTEX is an acronym meanings Navigational Telex, and as its name shows, it is a kind of narrow band radio teletype system for sending (by frequency shift keying) text messages expressed in a 7-unit code. The difference between the conventional narrow band teletype system and the NAVTEX is that a NAVTEX transmitter transmits nine control characters (header code) ahead of the main message, so that the receiver can identify the station, message type and serial number automatically.

## NAXTEX SYSTEM OPERATION

For navigation purposes, the world is divided into 16 areas as shown in the figure below. Each NAVTEX station in each area has an identification code, from "A" to "Z."




The frequency assigned to NAVTEX is only one (518kHz), and many stations exist in the same service coverage. If the stations were to transmit without any rule, the system would collapse due to mutual interference. To avoid this problem, the following rules apply.

- The transmission schedule is determined so that two or more stations having common a service area may not overlap in time.

- Each station transmits with minimum required power to cover its service area (200 nautical miles nominal).

The table below shows the transmission time schedule in Navarea I.

| | |
|---|---|
| Reykjavik (R) | 0318 0718 1118 1518 1918 2318 |
| Scheveningen (P) | 0348 0748 1148 1548 1948 2348 |
| Stockholm (J) | 0330 0730 1130 1530 1930 2330 |
| Oostend (T) | 0248 0648 1248 1848 2248 |
| Rogoland (L) | 0148 0548 0948 1348 1748 2148 |
| Brest le C. (F) | 0118 0518 0918 1318 1718 2118 |
| Cullercoast (G) | 0048 0448 0848 1648 2048 |
| Tallin (U) | 0030 0430 0830 1230 1630 2030 |
| Haernoesand (H) | 0000 0400 0800 1200 1600 2000 |
| Bodo (B) | 0018 0418 0900 1218 1618 2100 |

# MESSAGE FORMAT

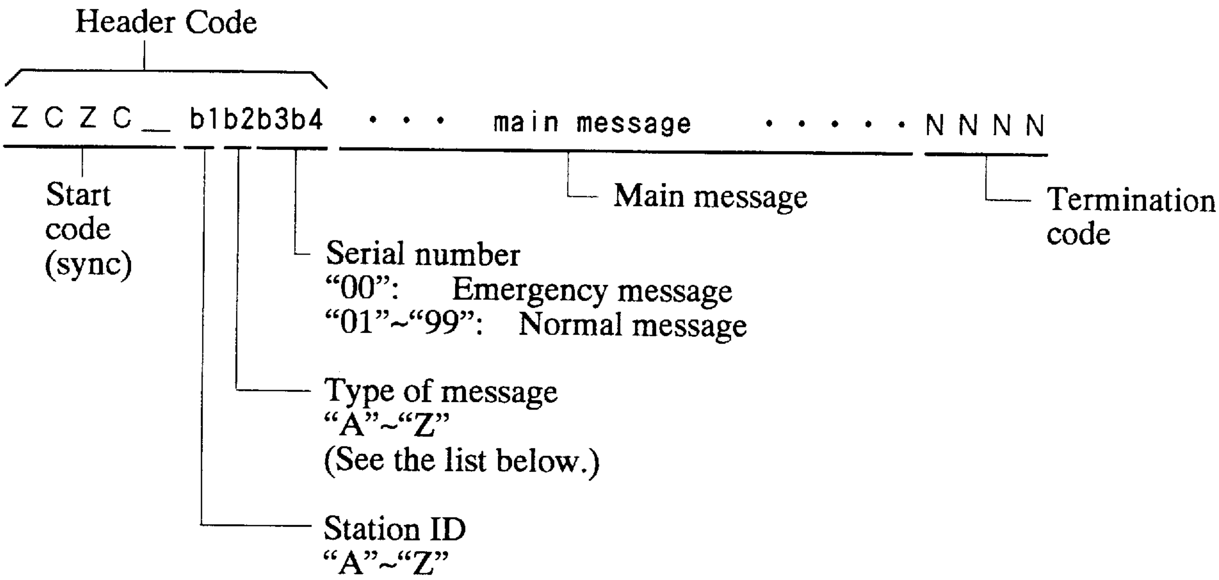
For automatic identification of messages, each message starts with nine control characters so called "Header codes."

The first five characters are always "ZCZC " and common to all messages. This part is used for message synchronization. The latter four characters are designated as B1, B2, B3 and B4, and indicate origin, category and serial number of the message.

Character B1 is the identification letter of the Navtex station; "A" thru "Z." Character B2 indicates the type of message, "A" thru "Z", as listed in the following page. Characters B3 and B4 indicate the serial number of the message. The serial numbers are counted up from "01" to "99", and starts from "01" again. Number "00" is specially reserved for important emergency messages, such as a search and rescue (SAR) message.

The end of each message is indicated by "NNNN" (four successive Ns').

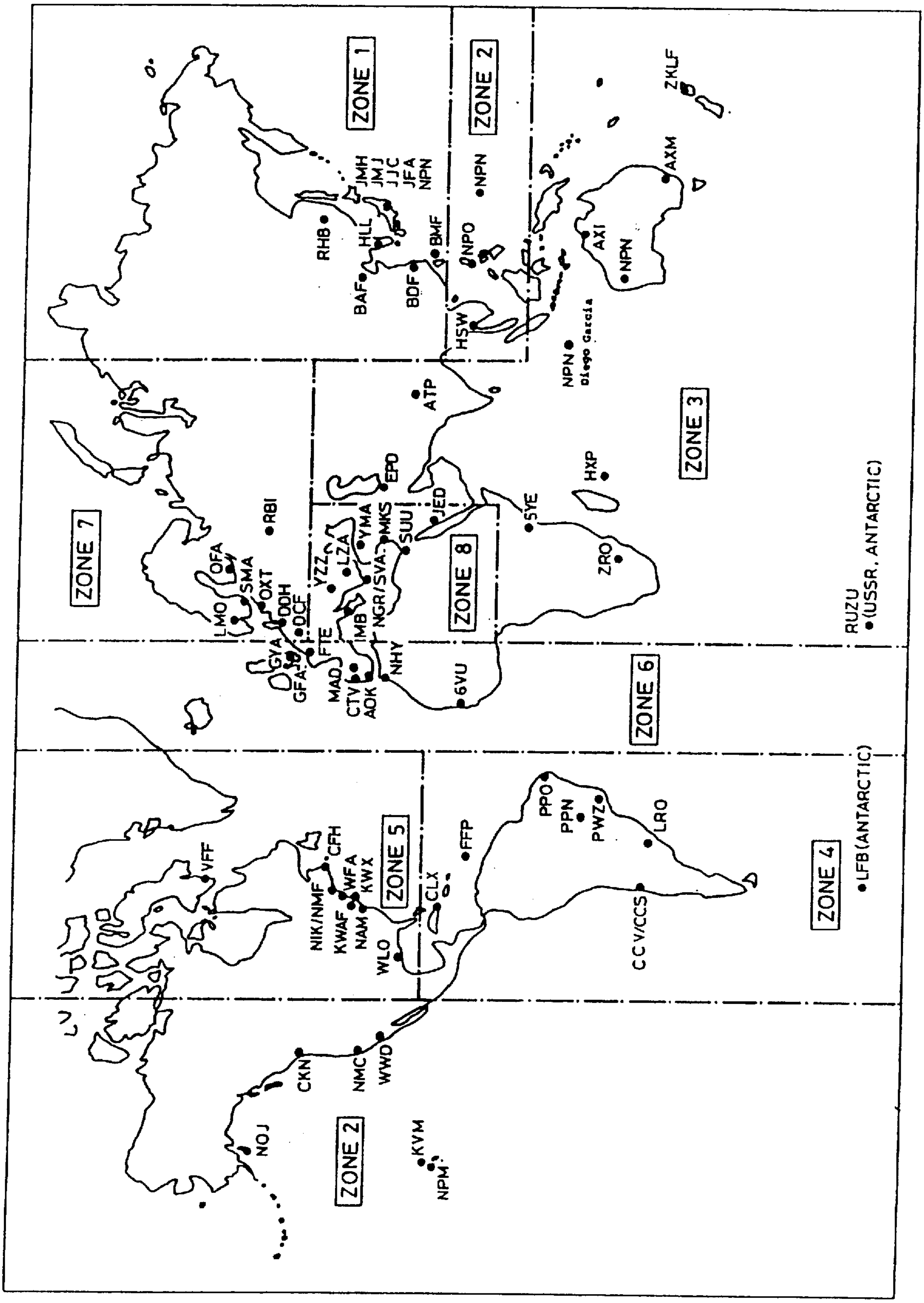
General message format is summarized below.




**[ Type of message (category) ]**

A: Coastal navigational information
B: Meteorological warning
C: Ice report
D: Search and rescue alert
E: Meteorological forecast
F: Pilot message
G: Decca message
H: Loran C-message
I: Omega message
J: Differential Omega message
K: Other electronic nav. system message
L: NAVAREA message
M-Y: No category assigned
Z: QRU (no message on hand)

# FACSIMILE STATION MAP



# FACSIMILE STATION LIST

## ZONE 1 NORTH PACIFIC OCEAN WESTERN PART

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | JMH | Tokyo | JAPAN |
| 1 | JMJ | Tokyo | JAPAN |
| 2 | JJC | Tokyo | JAPAN |
| | 9VF * | Tokyo | Via SINGAPORE |
| 3 | JFA | Tokyo | JAPAN |
| 4 | 3SD | Beijing | CHINA |
| 5 | BAF | Beijing | CHINA |
| 6 | BDF | Shanghai | CHINA |
| 7 | BMF | Taipei | TAIWAN |
| 8 | RHB | Khabarovsk | RUSSIA |
| 9 | HLL | Seoul | KOREA |

## ZONE 2 NORTH PACIFIC OCEAN EASTERN PART

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | NPN | Guam | MARIANA IS. |
| 1 | NPO | Sanglay Point | PHILIPINES |
| 2 | HSW | Bangkok | THAILAND |
| 3 | NPM | Pearl Harbour | USA |
| 4 | KVM | Honolulu | USA |
| 5 | NOJ | Kodiak Alaska | USA |
| 6 | CKN | Esquimalt | CANADA |
| 7 | NMC | San Francisco | USA |
| 8 | WWD | La Jolla | USA |
| 9 | AUX | | |

## ZONE 3 SOUTH PACIFIC OCEAN, INDIAN OCEAN, PERSIAN GULF

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | AXI | Darwin | AUSTRALIA |
| 1 | AXM | Camberra | AUSTRALIA |
| 2 | ZKLF | Auckland | NWE ZEALAND |
| 3 | NPN | Guam | Via AUSTRALIA |
| | | Guam | Via JAPAN |
| 4 | ATP | New Delhi | INDIA |
| 5 | EPD | Teheran | IRAN |
| | NPN * | Guam | Via Diego Garcia |
| 6 | 5YE | Nairobi | KENYA |
| 7 | ZRO | Pretoria | SOUTH AFRICA |
| 8 | HXP | Saint Denis | MAURITIUS |
| 9 | RUZU | Molodezhnaya | RUSSIA |

## ZONE 4 SOUTH ATLANTIC OCEAN

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | CLX | Casablanca | CUBA |
| 1 | FFP | Fort de France | MARTINIQUE |
| 2 | GYA | | |
| 3 | PPN | Brasilia | BRASIL |
| 4 | PWZ | Rio de Janeiro | BRASIL |
| | PRO * | Orinda | BRASIL |
| 5 | LRO | Buenos Aires | ALGENTINE |
| 6 | CCS | Santiago | CHILE |
| 7 | CCV | Belloto | CHILE |
| 8 | LFB | Centro Meteorologeco | ANTARCTIC |
| 9 | CBV | Valparaiso Armada de | CHILE |

## ZONE 5 NORTH ATLANTIC OCEAN WESTERN PART

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | WLO | Mobile | USA |
| 1 | NAM | Norfoik | USA |
| 2 | KWAF | Washington DC | USA |
| 3 | KW | Lewes | USA |
| | | Dalaware | USA |
| 4 | WFH | Brentwood | USA |
| 5 | NIK | Boston | USA |
| 6 | NMF | Boston | USA |
| 7 | CFH | Halifax | CANADA |
| 8 | VFF | Frobisher | CANADA |
| 9 | OXT | Skamlebaek | GREENLAND |
| | XPM | | |

## ZONE 6 NORTH ATLANTIC OCEAN EASTERN PART

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | GFA | Bracknell | UK |
| 1 | | Bracknell | UK |
| 2 | GYA | Northwood | UK |
| | GZZ * | | |
| | GYJ * | | |
| 3 | FTE | Paris | FRANCE |
| 4 | CTV | Monsanto | PORTUGAL |
| 5 | AOK | Rota | SPAIN |
| 6 | MAD | Madrid | SPAIN |
| | NPN * | | |
| 7 | NHY | Kenitora | MOROCCO |
| 8 | 6VU | Dakar | SENEGAL |
| 9 | AUX | | |

## ZONE 7 NORTH ATLANTIC OCEAN NORTHERN PART

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | DCF | Offenbach | GERMANY |
| 1 | DDK | Hamburg | GERMANY |
| | DDH * | | |
| 2 | OXT | Copenhagen | DENMARK |
| 3 | OLT | Praha-Modrany | CZECHOSLOVAKIA |
| 4 | SMA | Norrkoping | SWEDEN |
| 5 | LMO | Oslo | NORWAY |
| 6 | OFA | Helsinki | FINLAND |
| | OFH * | | |
| | OHG * | | |
| 7 | OFW | Vaasa | FINLAND |
| | TFA * | Reykjavic | ICELAND |
| 8 | RBI | Moscow | RUSSIA |
| 9 | AUX | | |

## ZONE 8 MEDITERRANEAN SEA

| STATION | CALL SIGN | TRANSMITTED FROM | |
|---|---|---|---|
| 0 | IMB | Rome | ITALY |
| 1 | NPN | Ahtens | GREECE |
| | SVG4 * | | |
| 2 | YZZ | Beograde | YUGOSLAVIA |
| 3 | NGR | Athens | GREECE |
| 4 | LZJ2 | Sofia | BULGALIA |
| 5 | YMA | Ankara | TURKEY |
| 6 | MKS | Episkopi | CYPRUS |
| 7 | SUU | Cairo | EGYPT |
| 8 | JED | Jeddah | SAUDI ARABIA |
| | HZN * | | |
| 9 | AUX | | |

## FACSIMILE STATION LIST

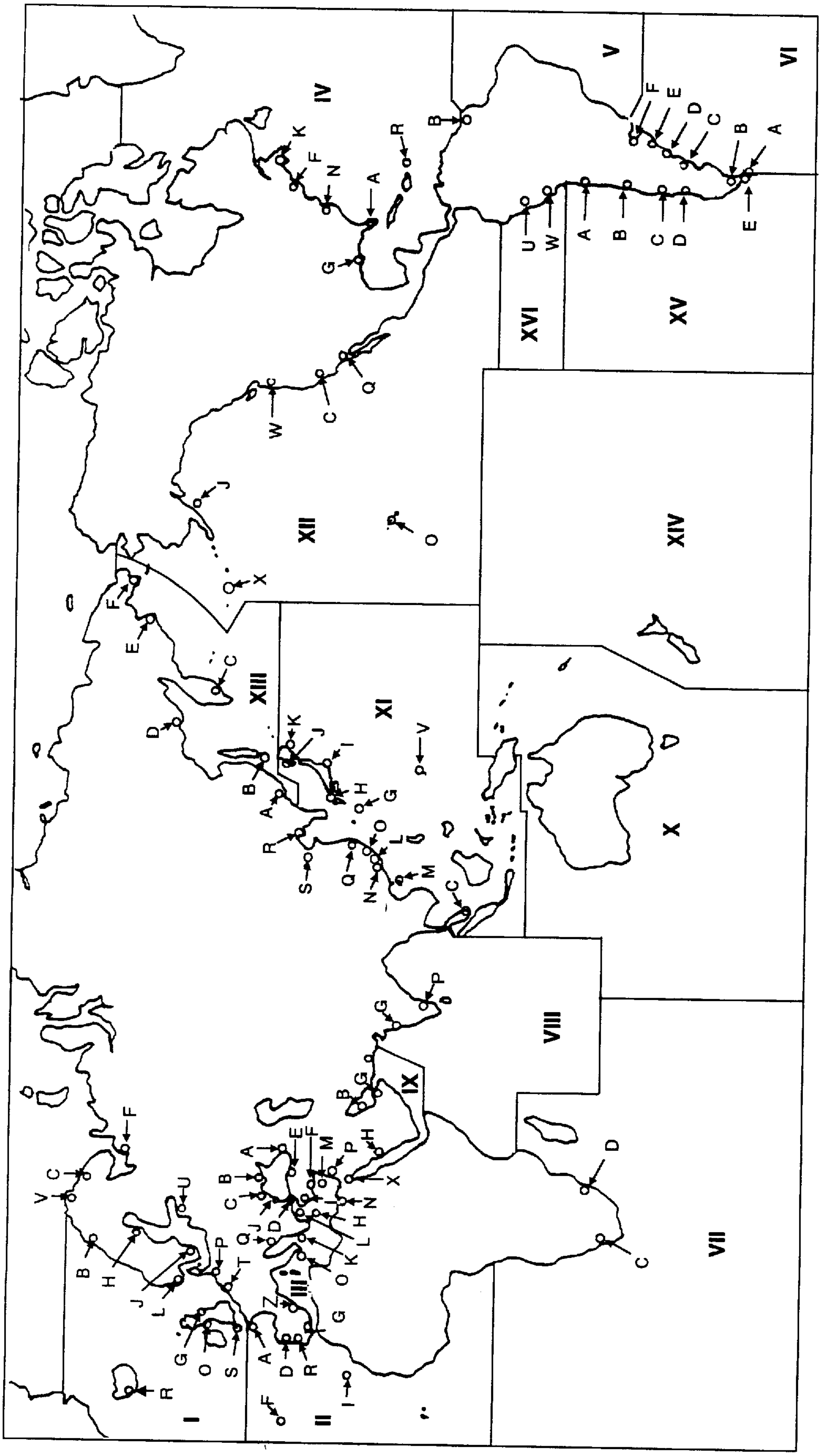
ZONE[0] is allocated for private channels.
(10 channels each for 12 stations)
*: Callsign not displayed.

# FACSIMILE STATION LIST (Alphabetic)

| | Nation | City | Zone No. | Station No. | Call sign | Remarks |
|---|---|---|---|---|---|---|
| A | ANTARCTIC | Meteorologic. | 4 | 8 | LFB | |
| | ARGENTINE | Buenos Aires | 4 | 5 | LRO | |
| | AUSTRALIA | Canberra | 3 | 1 | AXM | |
| | | Darwin | 3 | 0 | AXI | |
| | | H. E. Holt | 3 | 3 | NPN | US Navy |
| B | BRAZIL | Brasilia | 4 | 3 | PPN | |
| | | Orinda | 4 | 4 | PPO | |
| | | Rio de Janeiro | 4 | 4 | PWZ | |
| | BULGARIA | Sofia | 8 | 4 | LZJ2 | |
| C | CANADA | Esquimalt | 2 | 6 | CKN | |
| | | Frobishier | 5 | 8 | VFF | |
| | | Halifax | 5 | 7 | CFH | |
| | CHILE | Belloto | 4 | 7 | CCV | |
| | | Santiago | 4 | 6 | CCS | |
| | | Valparaiso | 4 | 9 | CBV | |
| | CHINA | Beijing | 1 | 4 | 3SD | |
| | | Beijing | 1 | 5 | BAF | |
| | | Shanghai | 1 | 6 | BDF | |
| | CUBA | Casablanca | 4 | 0 | CLX | |
| | CYPRUS | Episkopi | 8 | 6 | MKS | |
| | CZECHOSLOVAKIA | Praha-Modrany | 7 | 3 | OLT | |
| D | DENMARK | Copenhagen | 7 | 2 | OXT | |
| E | EGYPT | Cairo | 8 | 7 | SUU | |
| F | FINLAND | Helsinki | 7 | 6 | OFA | |
| | | | | | OFH | |
| | | | | | OHG | |
| | | Vaasa | 7 | 7 | OFW | |
| | FRANCE | Paris | 6 | 3 | FTE | |
| G | GREECE | Athens | 8 | 1 | NPN | |
| | | | | | SVG4 | |
| | | Athens | 8 | 3 | NGR | US Navy |
| | GREENLAND | Skamlebaek | 5 | 9 | OXT | |
| | | | | | XPM | |
| I | ICELAND | Reykjavik | 7 | 7 | TFA | |
| | INDIA | New Delhi | 3 | 4 | ATP | |
| | IRAN | Teheran | 3 | 5 | EPD | |
| | ITALY | Rome | 8 | 0 | IMB | |
| J | JAPAN | Tokyo | 1 | 0 | JMH | No. 1 |
| | | Tokyo | 1 | 1 | JMJ | No. 2 |
| | | Tokyo | 1 | 2 | JJC | JMSA & Kyodo |
| | | | | | 9VF | |
| | | Tokyo | 1 | 3 | JFA | Chuo Gyogyo |
| K | KENYA | Nairobi | 3 | 6 | 5YE | |
| | KOREA | Seoul | 1 | 9 | HLL | |

| | Nation | City | Zone No. | Station No. | Call sign | Remarks |
|---|---|---|---|---|---|---|
| M | MARIANA IS. | Guam | 2 | 0 | NPN | US Navy |
| | MARTINIQUE | Fort de France | 4 | 1 | FFP | |
| | MAURITIUS | Sain Denis | 3 | 8 | HXP | |
| | MOROCCO | Kenitora | 6 | 7 | NHY | |
| N | NEW ZEALAND | Auckland | 3 | 2 | ZKLF | |
| | NORWAY | Oslo | 7 | 5 | LMO | |
| P | PHILIPPINES | Sanglay Point | 2 | 1 | NPO | US Navy |
| | PORTUGAL | Monsanto | 6 | 4 | CTV | |
| S | SENEGAL | Dakar | 6 | 8 | 6VU | |
| | SAUDI ARABIA | Jeddah | 8 | 8 | JED | |
| | | | | | HZN | |
| | SOUTH AFRICA | Pretoria | 3 | 7 | ZRO | |
| | SPAIN | Rota | 6 | 5 | AOK | US Navy |
| | | Madrid | 6 | 6 | MAD | |
| | | | | | NPN | |
| | SWEDEN | Norrkoping | 7 | 4 | SMA | |
| T | TAIWAN | Taipei | 1 | 7 | BMF | |
| | THAILAND | Bangkok | 2 | 2 | HSW | |
| | TURKEY | Ankara | 8 | 5 | YMA | |
| U | UK | Bracknell | 6 | 0 | GFA | |
| | | Bracknell | 6 | 1 | GFA | |
| | | Northwood | 4 | 2 | GYA | For S. A. |
| | | Northwood | 6 | 2 | GYA | |
| | | | | | GZZ | |
| | | | | | GYJ | |
| | USA | Boston | 5 | 5 | NIK | |
| | | Boston | 5 | 6 | NMF | |
| | | Brentwood | 5 | 4 | WFH | |
| | | Diego Garcia | 3 | 5 | NPN | |
| | | Honolulu | 2 | 4 | KVM | |
| | | Kodiak Alaska | 2 | 5 | NOJ | |
| | | La Jolla | 2 | 8 | WWD | |
| | | Lewes | 5 | 3 | KWX | |
| | | Delaware | 5 | 3 | KWX | |
| | | Mobile | 5 | 0 | WLO | |
| | | Norfolk | 5 | 1 | NAM | |
| | | Pearl Harbour | 2 | 3 | NPM | US Navy |
| | | San Francisco | 2 | 7 | NMC | |
| | | Washington DC | 5 | 2 | KWAF | AIR Force |
| | | | | | RHB | |
| | RUSSIA | Khabarovsk | 1 | 8 | | |
| | | Molodezhnaya | 3 | 9 | RUZU | |
| | | Moscow | 7 | 8 | RBI | |
| W | GERMANY | Hamburg | 7 | 1 | DDK | |
| | | | | | DDH | |
| | | Offenback | 7 | 0 | DCF | |
| Y | YUGOSLAVIA | Belgrade | 8 | 2 | YZZ | |

# NAVTEX STATION MAP



# NAVTEX STATION LIST (1/2)

| Nav-area | Stn ID | Country | City | Time Schedule (UTC) | Remarks |
|---|---|---|---|---|---|
| I | B | NORWAY | Bodo | 0018, 0418, 0900, 1218, 1618, 2100 | |
| | C | RUSSIA | Murmansk | 0120, 0520, 0920, 1320, 1720, 2120 | |
| | F | RUSSIA | Arkhangelsk | 0200, 0600, 1000, 1400, 1800, 2200 | |
| | G | U.K. | Cullercoats | 0048, 0448, 0848, 1248, 1648, 2048 | |
| | H | SWEDEN | Haernoesand | 0000, 0400, 0800, 1200, 1600, 2000 | |
| | J | SWEDEN | Stockholm | 0300, 0730, 1130, 1530, 1930, 2330 | |
| | L | NORWAY | Rogaland | 0148, 0548, 0948, 1348, 1748, 2148 | |
| | O | U.K. | Portpatrick | 0130, 0530, 0930, 1330, 1730, 2130 | Pre-operational |
| | P | NETH. L | Scheveningen | 0348, 0748, 1148, 1548, 1948, 2348 | |
| | R | ICELAND | Reykjavik | 0318, 0718, 1118, 1518, 1918, 2318 | |
| | S | U.K. | Niton | 0018, 0418, 0900, 1218, 1618, 2100 | |
| | T | BELGIUM | Oostende | 0248, 0648, 1048, 1448, 1848, 2248 | |
| | U | RUSSIA | Tallin | 0030, 0430, 0830, 1230, 1630, 2030 | |
| | V | NORWAY | Vardoe | 0300, 0700, 1100, 1500, 1900, 2300 | |
| II | A | FRANCE | Brest-Le conq | | Planned |
| | D | SPAIN | Finisterre | 0030, 0430, 0830, 1230, 1630, 2030 | |
| | F | PORTUGAL | Azores | 0050, 0450, 0850, 1250, 1650, 2050 | |
| | I | SPAIN | Canary Islands | 0100, 0500, 0900, 1300, 1700, 2100 | |
| | R | PORTUGAL | Lisbon | 0250, 0650, 1050, 1450, 1850, 2250 | |
| | | CAMEROON | Douala | | Planned |
| III | A | RUSSIA | Novorossiysk | 0300, 0700, 1100, 1500, 1900, 2300 | |
| | B | RUSSIA | Mariupol | 0100, 0500, 0900, 1300, 1700, 2100 | |
| | C | RUSSIA | Odessa | 0230, 0630, 1030, 1430, 1830, 2230 | |
| | D | TURKEY | Istanbul | 0030, 0430, 0830, 1230, 1630, 2030 | Planned |
| | E | TURKEY | Samsun | 0040, 0440, 0840, 1240, 1640, 2040 | |
| | F | TURKEY | Antalya | 0050, 0450, 0850, 1250, 1650, 2050 | |
| | G | SPAIN | Tarifa | 0100, 0500, 0900, 1300, 1700, 2100 | |
| | H | GREECE | Iraklion | 0110, 0510, 0910, 1310, 1710, 2110 | |
| | I | TURKEY | Izmir | 0120, 0520, 0920, 1320, 1720, 2120 | |
| | J | BULGARIA | Varna | 0130, 0530, 0930, 1330, 1730, 2130 | |
| | K | GREECE | Kerkyra | 0140, 0540, 0940, 1340, 1740, 2140 | Planned |
| | L | GREECE | Limnos | 0150, 0550, 0950, 1350, 1750, 2150 | |
| | M | CYPRUS | Troodos | 0200, 0600, 1000, 1400, 1800, 2200 | |
| | N | EGYPT | Alexandria | 0210, 0610, 1010, 1410, 1810, 2210 | |
| | O | MALTA | Malta | 0220, 0620, 1020, 1420, 1820, 2220 | Planned |
| | P | ISRAEL | Haifa | 0020, 0420, 0820, 1220, 1620, 2020 | Planned |
| | Q | YUGO. | Split | 0250, 0650, 1050, 1450, 1850, 2250 | |
| | Z | SPAIN | Cabo La Nao | | |
| | | FRANCE | La Garde | | |
| IV | A | USA | Miami | 0000, 0600, 1200,1800 | Pre-operational |
| | B | BERMUDA | St. Georges | 0100, 0700, 1300, 1900 | |
| | F | USA | Boston | 0445, 1045, 1645, 2245 | |
| | G | USA | New Orleans | 0300, 0900, 1500, 2100 | |
| | K | CANADA | Sydney | 0040, 0540, 0940, 1340, 1740, 2140 | Under trials |
| | N | USA | Portsmouth | 0130, 0730, 1330, 1930 | Pre-operational |
| | R | USA | San Juan | 0415, 1015, 1615, 2215 | Pre-operational |
| V | | URUGUAY | Colonia | | Planned |
| | | URUGUAY | Laguna D Sauce | | Planned |
| | | URUGUAY | La Paloma | | Planned |
| | | URUGUAY | Montevideo | | Planned |
| | | URUGUAY | Punta de Este | | Planned |
| | | URUGUAY | Salto | | Planned |

# NAVTEX STATION LIST (2/2)

| Nav-area | Stn ID | Country | City | Time Schedule (UTC) | Remarks |
|---|---|---|---|---|---|
| | A | ARGENTINA | Ushuaia | 0240, 0840, 1440, 2040 | |
| | B | ARGENTINA | Rio Gallegos | 0140, 0740, 1340, 1940 | |
| | C | ARGENTINA | Rivadavia | 0040, 0640, 1240, 1840 | |
| VI | D | ARGENTINA | Bahia Blanca | 0210, 0810, 1410, 2010 | planned |
| | E | ARGENTINA | Mar Del Plata | 0110, 0710, 1310, 1910 | |
| | F | ARGENTINA | Buenos Aires | 0510, 1110, 1710, 2310 | |
| | G | ARGENTINA | Rosario | 0110, 0610, 1210, 1810 | |
| VII | C | S. AFRICA | CAPETOWN | 0020, 0420, 0820, 1220, 1620, 2020 | |
| | D | S. AFRICA | DURBAN | 0120, 0520, 0920, 1320, 1720, 2120 | |
| VIII | G | INDIA | Bombay | 0100, 0500, 0900, 1300, 1700, 2100 | |
| | P | INDIA | Madras | 0230, 0630, 1030, 1430, 1830, 2230 | |
| | H | S. ARABIA | Jeddah | | Planned |
| IX | G | S. ARABIA | Dammam | | Planned |
| | X | EGYPT | Ismailia | | Planned |
| | B | BAHRAIN | Hamala | 0010, 0410, 0810, 1210, 1610, 2010 | Planned |
| | V | USA | Guam | 0100, 0700, 1300, 1900 | |
| | C | SINGAPORE | Jurong | 0020, 0420, 0820, 1220, 1620, 2020 | |
| | G | JAPAN | Naha | 0100, 0500, 0900, 1300, 1700, 2100 | |
| XI | H | JAPAN | Moji | 0110, 0510, 0910, 1310, 1710, 2110 | |
| | I | JAPAN | Yokohama | 0120, 0520, 0920, 1320, 1720, 2120 | |
| | J | JAPAN | Otaru | 0130, 0530, 0930, 1330, 1730, 2130 | |
| | K | JAPAN | Kushiro | 0140, 0540, 0940, 1340, 1740, 2140 | |
| | L | HONG KONG | Hong Kong | 0200, 0600, 1000, 1400, 1800, 2200 | |
| | M | CHINA | Zhanjiang | | |
| | N | CHINA | Guangzhou | 0210,0610,1010,1410,2210 | |
| | O | CHINA | Fuzhou | | |
| | R | CHINA | Dalian | 0250,0650,1050,1450,2250 | |
| | Q | CHINA | Shanghai | 0240,0640,1040,1440,2240 | |
| | S | CHINA | Tianjin | | |
| | | CHINA | Hainan | | |
| | C | USA | San Francisco | 0400, 1000, 1600, 2200 | Pre-operational |
| | W | USA | Astoria | 0130, 0730, 1330, 1930 | Pre-operational |
| | Q | USA | Cambria | 0445, 1045, 1645, 2245 | Pre-operational |
| XII | J | USA | Kodiak | 0300, 0900, 1500, 2100 | Pre-operational |
| | O | USA | Honolulu | 0040, 0640, 1240, 1840 | |
| | X | USA | Adak | 0000, 0600, 1200, 1745 | Planned |
| | A | RUSSIA | Vladivostok | 0000, 0400, 0800, 1200, 1600, 2000 | |
| | B | RUSSIA | Kholmsk | 0010, 0410, 0810, 1210, 1610, 2010 | |
| XIII | C | RUSSIA | Petropavlovsk | 0050, 0450, 0850 | |
| | D | RUSSIA | Magadan | 0030, 0430, 0830, 1230, 1630, 2030 | |
| | E | RUSSIA | Beringovskiy | 0040, 0440, 0840, 1240, 1640, 2040 | |
| | F | RUSSIA | Providenya | 0050, 0450, 0850, 1250, 1650, 2050 | |
| | A | CHILE | Antofagasta | | |
| | B | CHILE | Valparaiso | 0010, 0410, 0810, 1210, 1610, 2010 | |
| XV | C | CHILE | Talcahuano | | |
| | D | CHILE | Puerto Montt | | |
| | E | CHILE | Magallanes | | |
| | S | PERU | Paita | 0300, 0700, 1100, 1500, 1900, 2300 | Planned |
| XVI | U | PERU | Callao | 0320, 0720, 1120, 1520, 1920, 2320 | Planned |
| | W | PERU | Mollendo | 0340, 0740, 1140, 1540, 1940, 2340 | Planned |

*NOTE: The list above shows the stations registered with the International Frequency Registration Board (IFRB) for transmission of 518 kHz (as of Oct, 1992). Note that not all stations are operational.*

# PRIVATE CHANNEL LIST

(To be filled by operator)

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| 0 | | 0 | PRV | | | |
| | | 1 | PRV | | | |
| | | 2 | PRV | | | |
| | | 3 | PRV | | | |
| | | 4 | PRV | | | |
| | | 5 | PRV | | | |
| | | 6 | PRV | | | |
| | | 7 | PRV | | | |
| | | 8 | PRV | | | |
| | | 9 | PRV | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| 0 | | 0 | PRV | | | |
| | | 1 | PRV | | | |
| | | 2 | PRV | | | |
| | | 3 | PRV | | | |
| | | 4 | PRV | | | |
| | | 5 | PRV | | | |
| | | 6 | PRV | | | |
| | | 7 | PRV | | | |
| | | 8 | PRV | | | |
| | | 9 | PRV | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| 0 | | 0 | PRV | | | |
| | | 1 | PRV | | | |
| | | 2 | PRV | | | |
| | | 3 | PRV | | | |
| | | 4 | PRV | | | |
| | | 5 | PRV | | | |
| | | 6 | PRV | | | |
| | | 7 | PRV | | | |
| | | 8 | PRV | | | |
| | | 9 | PRV | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| 0 | | 0 | PRV | | | |
| | | 1 | PRV | | | |
| | | 2 | PRV | | | |
| | | 3 | PRV | | | |
| | | 4 | PRV | | | |
| | | 5 | PRV | | | |
| | | 6 | PRV | | | |
| | | 7 | PRV | | | |
| | | 8 | PRV | | | |
| | | 9 | PRV | | | |

# AUXILIARY CHANNEL LIST

(To be filled by operator)

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| | | 0 | AUX | | | |
| | | 1 | AUX | | | |
| | | 2 | AUX | | | |
| | | 3 | AUX | | | |
| | | 4 | AUX | | | |
| | | 5 | AUX | | | |
| | | 6 | AUX | | | |
| | | 7 | AUX | | | |
| | | 8 | AUX | | | |
| | | 9 | AUX | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| | | 0 | AUX | | | |
| | | 1 | AUX | | | |
| | | 2 | AUX | | | |
| | | 3 | AUX | | | |
| | | 4 | AUX | | | |
| | | 5 | AUX | | | |
| | | 6 | AUX | | | |
| | | 7 | AUX | | | |
| | | 8 | AUX | | | |
| | | 9 | AUX | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| | | 0 | AUX | | | |
| | | 1 | AUX | | | |
| | | 2 | AUX | | | |
| | | 3 | AUX | | | |
| | | 4 | AUX | | | |
| | | 5 | AUX | | | |
| | | 6 | AUX | | | |
| | | 7 | AUX | | | |
| | | 8 | AUX | | | |
| | | 9 | AUX | | | |

| ZONE | STATION | CHANNEL | CALL SIGN (display) | CALL SIGN (actual) | FREQUENCY | REMARKS |
|---|---|---|---|---|---|---|
| | | 0 | AUX | | | |
| | | 1 | AUX | | | |
| | | 2 | AUX | | | |
| | | 3 | AUX | | | |
| | | 4 | AUX | | | |
| | | 5 | AUX | | | |
| | | 6 | AUX | | | |
| | | 7 | AUX | | | |
| | | 8 | AUX | | | |
| | | 9 | AUX | | | |

# TIMER SCHEDULE LIST

(To be filled by operator)

| No. | ZONE | STATION | CHANNEL | START TRIGGER | TIME | | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | START | STOP | |
| 1 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 2 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 3 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 4 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 5 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 6 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 7 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 8 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 9 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 10 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 11 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 12 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 13 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 14 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 15 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 16 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |

| No. | ZONE | STATION | CHANNEL | START TRIGGER | TIME | | RENARKS |
|---|---|---|---|---|---|---|---|
| | | | | | START | STOP | |
| 1 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 2 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 3 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 4 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 5 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 6 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 7 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 8 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 9 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 10 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 11 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 12 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 13 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 14 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 15 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |
| 16 | | | | * (AUTO)<br>s (TIME: Fine)<br>f (TIME: Rough) | : | : | |

# APPENDIX-C IMPROVEMENT OF RECEIVER S/N RATIO(Remedy for RFI)

## PROBLEM

FAX-210 may experience a decrease in receiver sensitivity. This may occur if the coaxial cable connected between the optional preamp unit and the main unit is extended by the use of an extention cable.

## CAUSE

The outer conductor of the coaxial cable picks up unwanted singal/noise.

## OUTLINE OF FILED MODIFICATION

Connect a vinyl ground wire between the shield of the coaxial cable at the base of the preamp unit and the mast. Figures 1 and 2 on the next page illustrate how to do this modification.

NOTE: The coaxial cable should not be laid close to or bound with power cables or control cables.

## MODIFICATION REQUIRED /NOT REQUIRED

Required

1) If most of the original supply coaxial cable is outside of the mast.

2) Extension cable is used.

3) Where RFI/noise is a problem.

Not Required

1) Coaxial cable runs inside a steel mast or conduit.

2) Where the original supply coaxial cable has been replaced (or can replaced) with one having an armor.

3) For FRP ships and non-maetallic masts where a good ground cannot be made at the base of the preamp unit.

4) If the coaxial cable can be shortened

# FACTORY-MODIFIED SET

If the factory-added ground wire is not long enough, run an additional ground wire between the ground terminal and the mast. See the figure below.

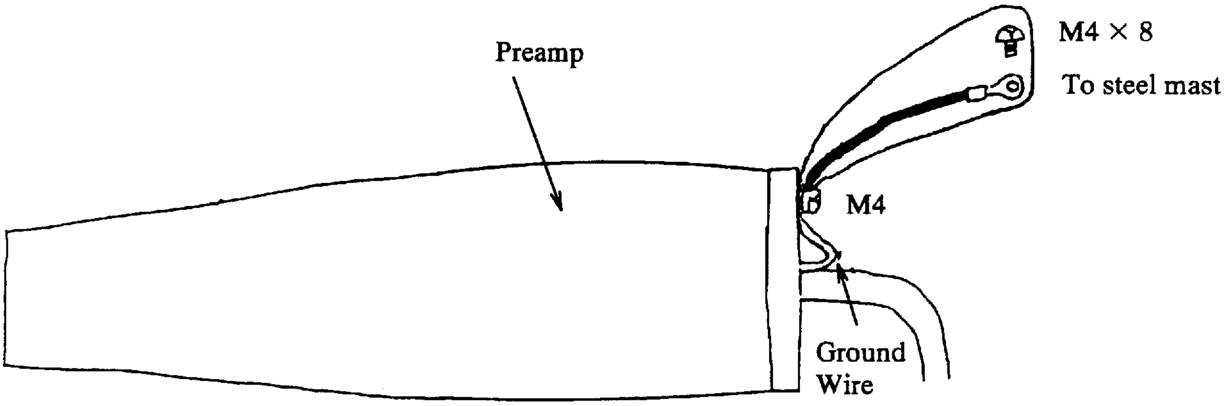



Fig. 1

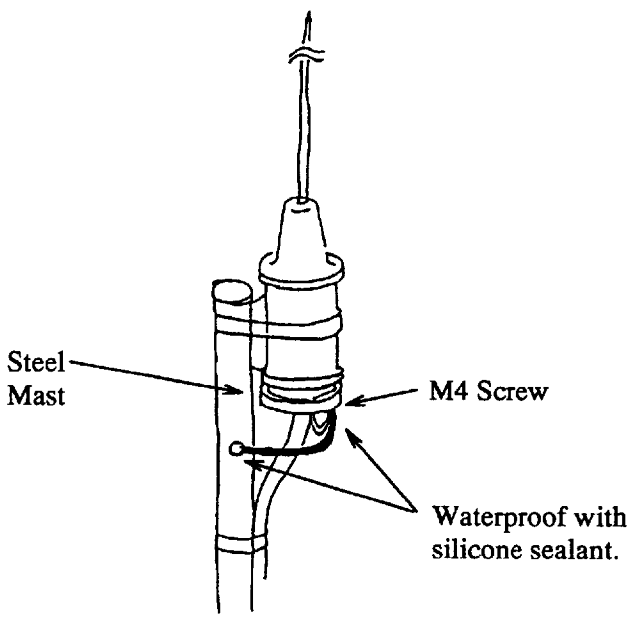



Fig. 2

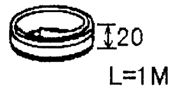
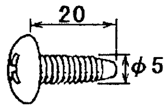
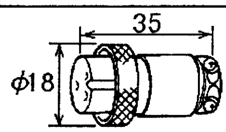
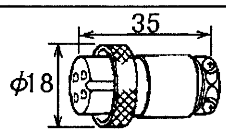
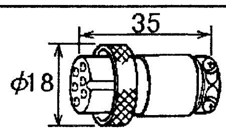
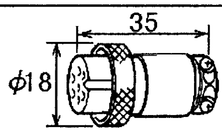
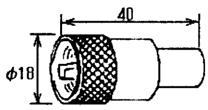
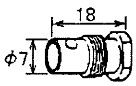
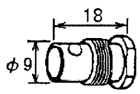
A-1

FURUNO

| | | |
|---|---|---|
| CODE NO. | 000-054-081 | 08AN-X-9401-1 |
| TYPE | CP08-01100 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | 銅板<br>COPPER STRAP |   | 0.3X20X1000MM | | 1 | |
| | | | CODE NO. | 000-810-230 | | |
| 2 | +ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ<br>+TAPPING SCREW |   | 5X20 SUS304 1ｼｭ | | 4 | |
| | | | CODE NO. | 000-802-081 | | |
| 3 | ｺﾈｸﾀ<br>CONNECTOR |   | FM14-3P | | 1 | |
| | | | CODE NO. | 000-511-405 | | |
| 4 | ｺﾈｸﾀ<br>CONNECTOR |   | FM14-4P | | 1 | |
| | | | CODE NO. | 000-108-368 | | |
| 5 | ｺﾈｸﾀ<br>CONNECTOR |   | FM14-6P | | 1 | |
| | | | CODE NO. | 000-116-185 | | |
| 6 | ｺﾈｸﾀ<br>CONNECTOR |   | FM14-7P | | 1 | |
| | | | CODE NO. | 000-113-345 | | |
| 7 | 同軸プラグ<br>COAX. PLUG |   | FM-MP-7 | | 1 | |
| | | | CODE NO. | 000-108-859 | | |
| 8 | ｱﾀﾞﾌﾟﾀ<br>REDUCER (S) |   | MP-M3A | | 1 | |
| | | | CODE NO. | 000-108-860 | | |
| 9 | ｱﾀﾞﾌﾟﾀ<br>REDUCER (L) |   | MP-M5A | | 1 | |
| | | | CODE NO. | 000-108-861 | | |

DWG NO. C6249-M01- C

FURUNO ELECTRIC CO., LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

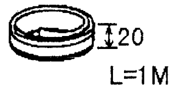
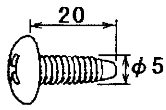
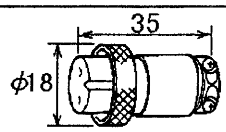
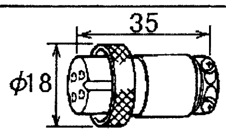
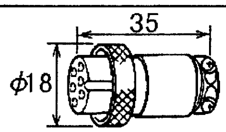
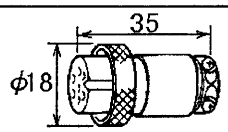
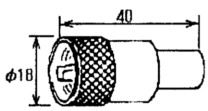
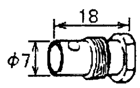
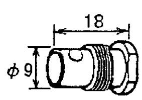
A-2

FURUNO

| CODE NO. | 000-054-082 | 08AN-X-9402 -1 |
|---|---|---|
| TYPE | CP08-01110 | 1/1 |

# 工事材料表

INSTALLATION MATERIALS

| 番号 NO. | 名称 NAME | 略図 OUTLINE | 型名／規格 DESCRIPTIONS | | 数量 Q'TY | 用途／備考 REMARKS |
|---|---|---|---|---|---|---|
| 1 | 銅板 COPPER STRAP |  | 0.3X20X1000MM | | 1 | |
| | | | CODE NO. | 000-810-230 | | |
| 2 | +トラスタッピンネジ +TAPPING SCREW |  | 5X20 SUS304 1シュ | | 4 | |
| | | | CODE NO. | 000-802-081 | | |
| 3 | コネクタ CONNECTOR |  | FM14-2P | | 1 | |
| | | | CODE NO. | 000-511-406 | | |
| 4 | コネクタ CONNECTOR |  | FM14-4P | | 1 | |
| | | | CODE NO. | 000-108-368 | | |
| 5 | コネクタ CONNECTOR |  | FM14-6P | | 1 | |
| | | | CODE NO. | 000-116-185 | | |
| 6 | コネクタ CONNECTOR |  | FM14-7P | | 1 | |
| | | | CODE NO. | 000-113-345 | | |
| 7 | 同軸プラグ COAX. PLUG |  | FM-MP-7 | | 1 | |
| | | | CODE NO. | 000-108-859 | | |
| 8 | アダプタ REDUCER(S) |  | MP-M3A | | 1 | |
| | | | CODE NO. | 000-108-860 | | |
| 9 | アダプタ REDUCER(L) |  | MP-M5A | | 1 | |
| | | | CODE NO. | 000-108-861 | | |

DWG NO. C6249-M02- D

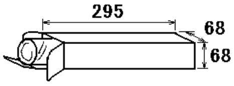
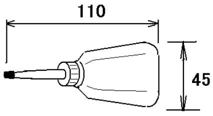
FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

| CODE NO. | 000-054-083 | 08AN-X-9501 -2 |
|---|---|---|
| TYPE | FP08-00600 | 1/1 |

# 付属品表
## ACCESSORIES

| 番号<br>NO. | 名称<br>NAME | 略図<br>OUTLINE | 型名／規格<br>DESCRIPTIONS | 数量<br>Q'TY | 用途／備考<br>REMARKS |
|---|---|---|---|---|---|
| 1 | ｻｰﾏﾙ紙<br>THERMAL PAPER |  | TP-1030A<br>CODE NO. 000-802-891 | 2 | |
| 2 | 潤滑油<br>LUBRICATION OIL |  | ﾐｼﾝ油 MACHINE 28MLｲﾘ<br>CODE NO. 000-149-213 | 1 | |

08AN-X-9501

FURUNO ELECTRIC CO .,LTD.

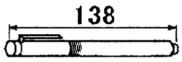
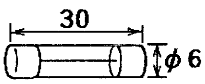
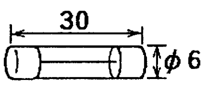
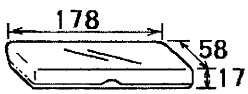
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

A-4

FURUNO

| CODE NO. | 000-054-079 | 08AN-X-9301 -2 |
|---|---|---|
| TYPE | SP08-01100 | BOX NO. P |

| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | QUANTITY | | | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| | | | | WORKING | | SPARE | |
| | | | | PER SET | PER VES | | |
| 1 | ﾍｯﾄﾞｸﾘｰﾅｰ<br>HEAD CLEANER |  | TH-2000(本体) | | 1 | | 000-122-997 |
| 2 | ﾋｭｰｽﾞ<br>FUSE |  | FGBO 2A AC250V | 1 | | 1 | 000-549-020 |
| 3 | ﾋｭｰｽﾞ<br>FUSE |  | FGBO-A 3A AC125V | 1 | | 1 | 000-549-063 |
| 4 | 予備品箱<br>SPARE PARTS BOX |  | F710ﾖｳ | | 1 | | 000-831-610 |
| | | | | | | | |
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| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | C6249-P01- C | 1/1 |
|---|---|---|---|---|

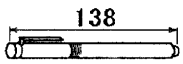
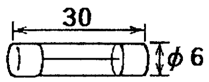
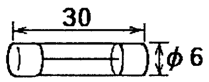
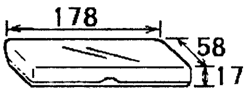
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

A-5

# FURUNO

| | | | |
|---|---|---|---|
| CODE NO. | 000-054-080 | 08AN-X-9302 -2 | |
| TYPE | SP08-01110 | BOX NO. | P |

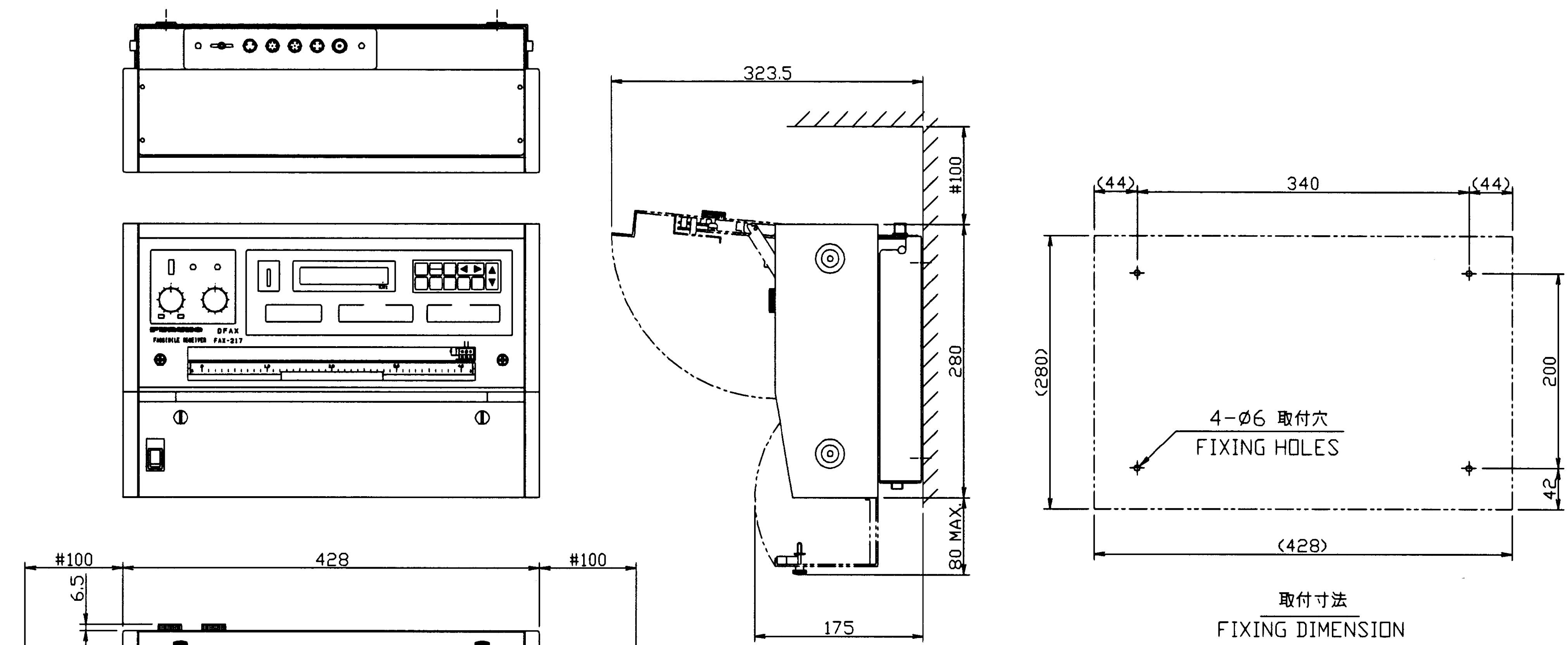
| SHIP NO. | SPARE PARTS LIST FOR | U S E | SETS PER VESSEL |
|---|---|---|---|
| | | | |

| ITEM NO. | NAME OF PART | OUTLINE | DWG. NO. OR TYPE NO. | QUANTITY: WORKING PER SET | QUANTITY: WORKING PER VES | QUANTITY: SPARE | REMARKS/CODE NO. |
|---|---|---|---|---|---|---|---|
| 1 | ﾍｯﾄﾞｸﾘｰﾅｰ<br>HEAD CLEANER |  | TH-2000(本体) | | 1 | | 000-122-997 |
| 2 | ﾋｭｰｽﾞ<br>FUSE |  | FGBO 7A AC125V | 1 | | 1 | 000-549-013 |
| 3 | ﾋｭｰｽﾞ<br>FUSE |  | FGBO-A 3A AC125V | 1 | | 1 | 000-549-063 |
| 4 | 予備品箱<br>SPARE PARTS BOX |  | F710ﾖｳ | | 1 | | 000-831-610 |
| | | | | | | | |
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| MFR'S NAME | FURUNO ELECTRIC CO.,LTD. | DWG NO. | C6249-P02- C | 1/1 |
|---|---|---|---|---|

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO




| 寸法区分(mm) DIMENSION | 公差(mm) TOLERANCE |
|---|---|
| 0 < L ≦ 50 | ±1.5 |
| 50 < L ≦ 100 | ±2.5 |
| 100 < L ≦ 500 | ±3 |

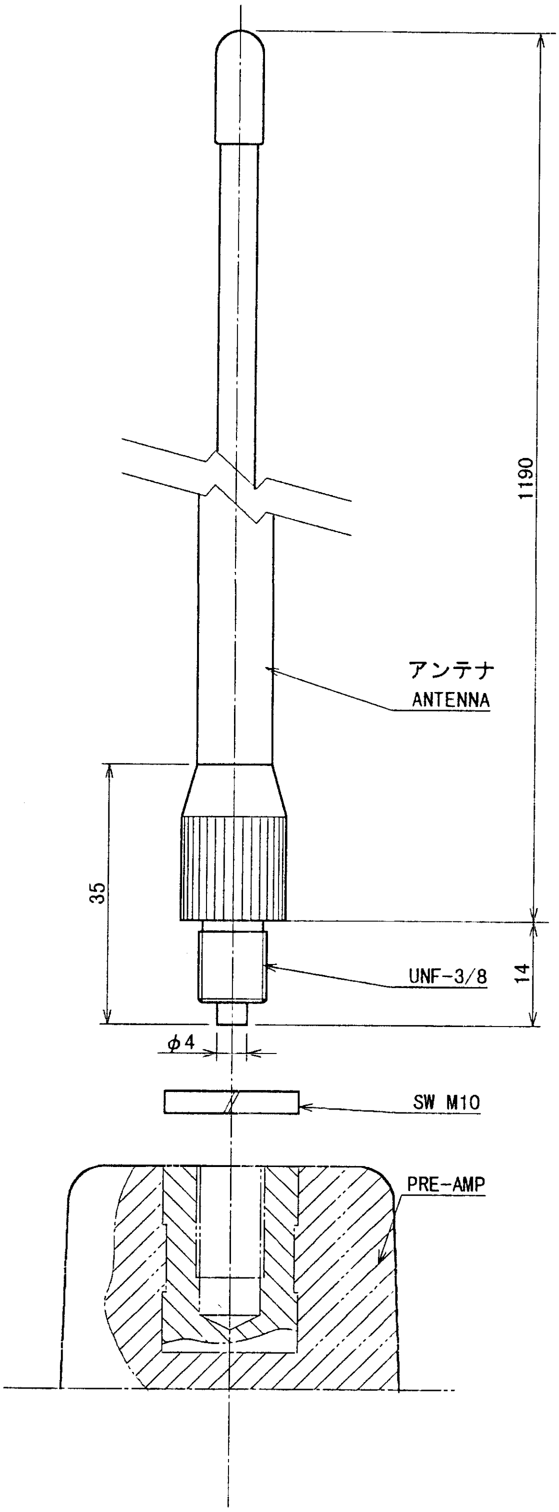
表1 TABLE 1

注記
1）指定なき寸法公差は表1による。
2）#：推奨する最小サービス空間寸法。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. #: RECOMMENDED SERVICE CLEARANCE.

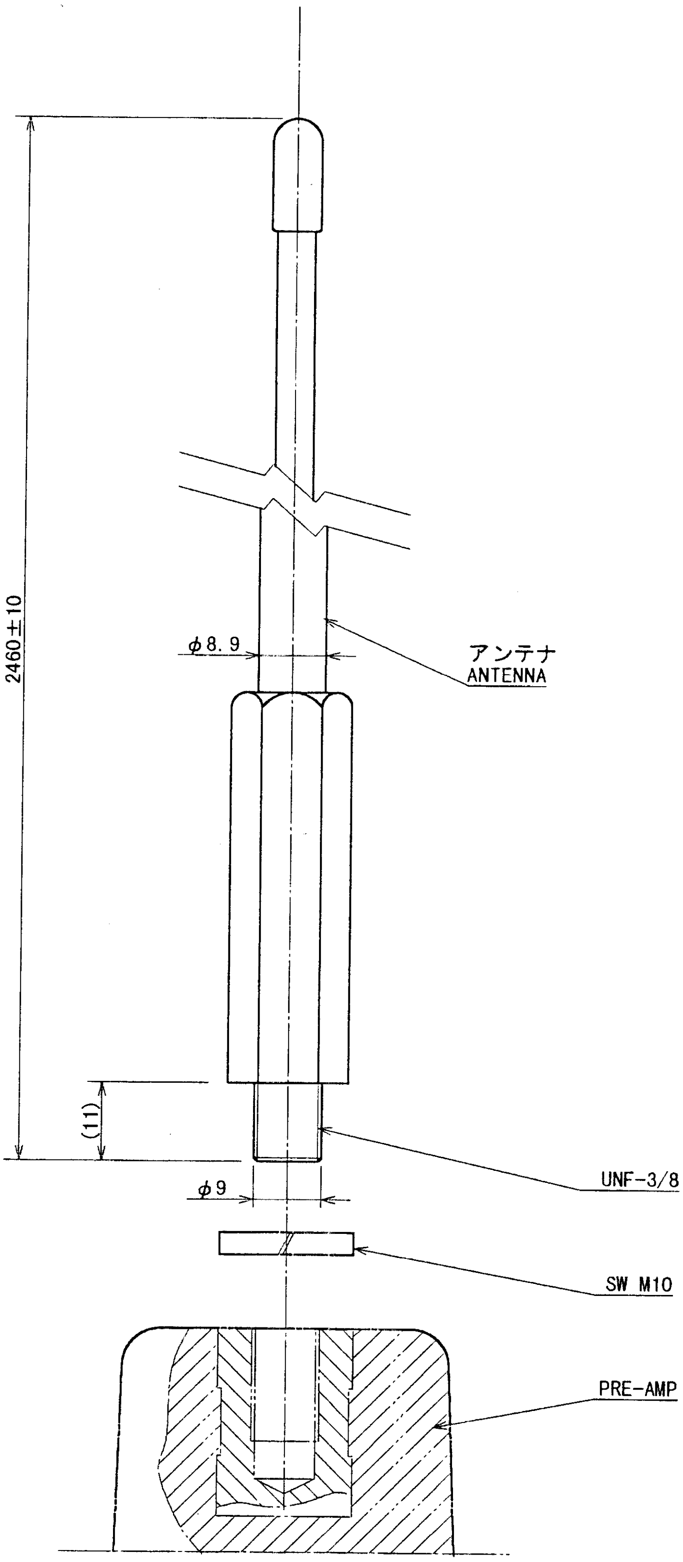
| | | | |
|---|---|---|---|
| DRAWN | Mar. 22 '02 T.YAMASAKI | TITLE | FAX-210 |
| CHECKED | Mar. 25 '02 Y. K. | 名称 | ファクシミリ受画装置 |
| APPROVED | Mar. 25 '02 Y. K. | | 外寸図 |
| SCALE 1/6 | MASS 12 kg ±10% | NAME | FACSIMILE RECEIVER |
| DWG.No. | C6249-G01-D | | OUTLINE DRAWING |

FURUNO ELECTRIC CO., LTD.




| | | | |
|---|---|---|---|
| DRAWN June 27 '00 T.YAMASAKI | | TITLE | FAW-1.2 |
| CHECKED June 27 '00 Y. Kimura | | 名称 | 1.2m ホイップアンテナ |
| APPROVED June 27 '00 Y. Kimura | OTHERS NX-500/600 | | 外寸図 |
| SCALE 1/1 | MASS 0.5 kg | NAME | 1.2m WHIP ANTENNA |
| DWG. No. C5509-G03-C | | | OUTLINE DRAWING |

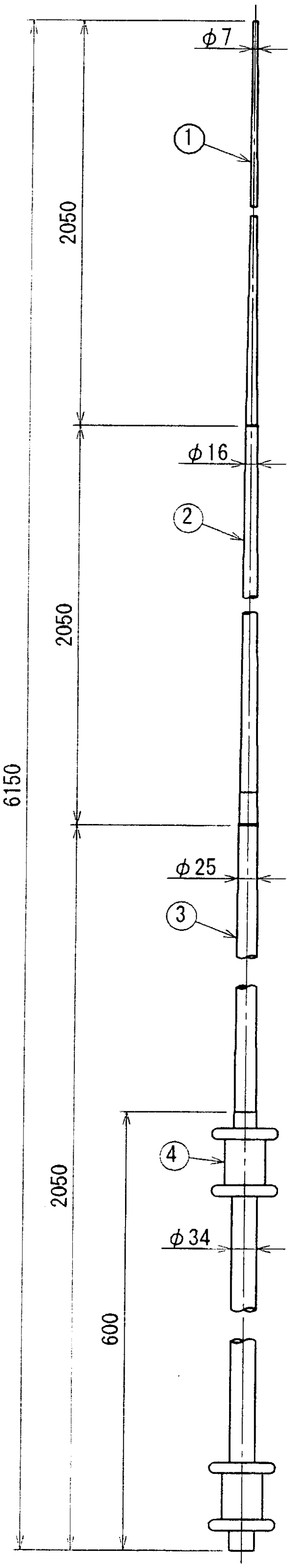
FURUNO ELECTRIC CO., LTD.

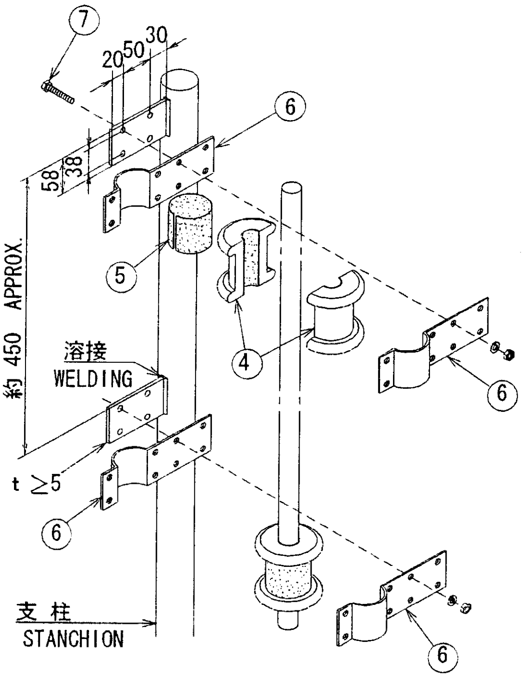



| | | | |
|---|---|---|---|
| DRAWN June 27 '00 T.YAMASAKI | | TITLE | 04S4176-1 |
| CHECKED June 27 '00 Y. Kim | | 名称 | 2. 6m ホイップアンテナ |
| APPROVED June 27 '00 Y. Kim | | | 外寸図 |
| SCALE 1/1 | MASS 0. 5 kg | NAME | 2. 6m WHIP ANTENNA |
| DWG. No. C4002-018-F | | | OUTLINE DRAWING |

FURUNO ELECTRIC CO., LTD.

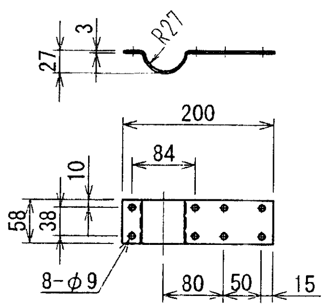
FURUNO



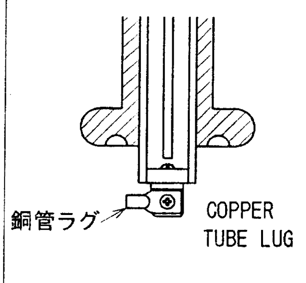




装備例 （支柱造船所手配）
EXAMPLE OF INSTLLATION

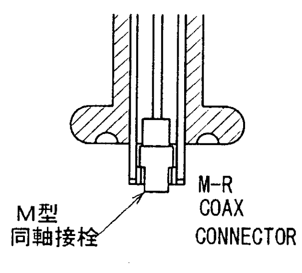
取 付 金 具
BRACKET




FAW-6R2




FAW-6RP2




| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG No | 摘要 REMARKS |
|---|---|---|---|---|---|
| 7 | ボルト／ナット BOLT/NUT | SUS | 16 PAIRS | BRACKET (000-571-590) | M8 |
| 6 | 取付金具 SUPPORT ARM | SUS | 2 PAIRS | | t=3mm |
| 5 | 緩衝ゴム板 CUSHION RUBBER | ネオプレンゴム NEOPRENE | 1 | | t=2mm |
| 4 | 上部ホルダー UPPER HOLDER | FRP | 1/2x2 | FAW-6R2 (000-572-109) OR FAW-6RP2 (000-572-108) | |
| 3 | 基部素子 LOWER ELEMENT | グラスファイバ FIBERGLASS | 1 | | |
| 2 | 継素子 MIDDLE ELEMENT | グラスファイバ FIBERGLASS | 1 | | |
| 1 | 上部素子 UPPER ELEMENT | グラスファイバ FIBERGLASS | 1 | | |

| | |
|---|---|
| DRAWN Sep.27'00 T.YAMASAKI | TITLE FAW-6R2/6RP2 |
| CHECKED Sep.27'00 Y.Kani | 名称 ホイップアンテナ |
| APPROVED Sep.27'00 Y.Kani | 外寸図 |
| SCALE 1/10 · MASS ±10% ELEMENT:3 kg | NAME WHIP ANTENNA |
| DWG. No. C5011-038- D | OUTLINE DRAWING |

FURUNO ELECTRIC CO., LTD.

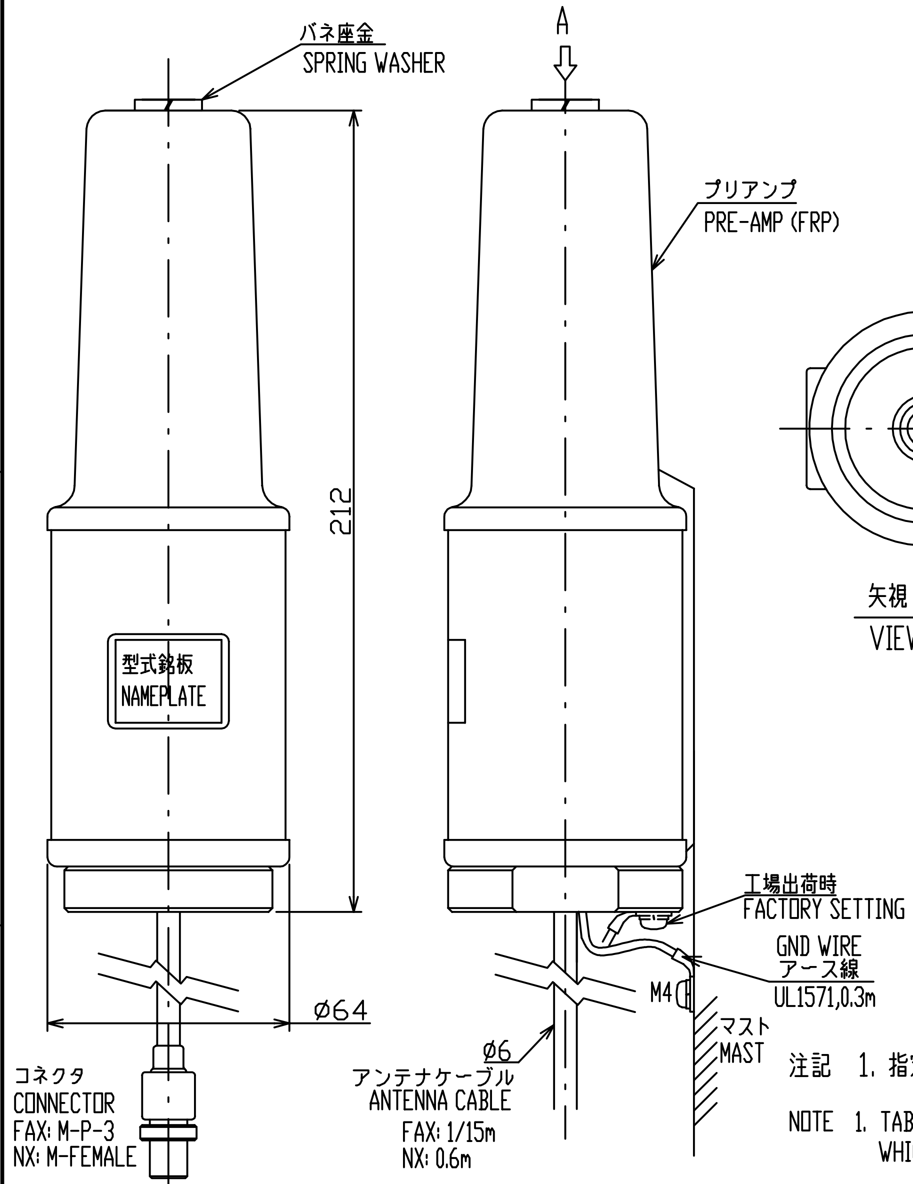
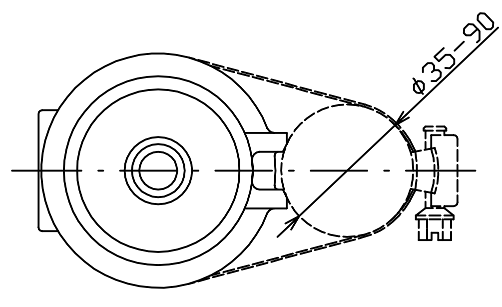



表 1 TABLE 1

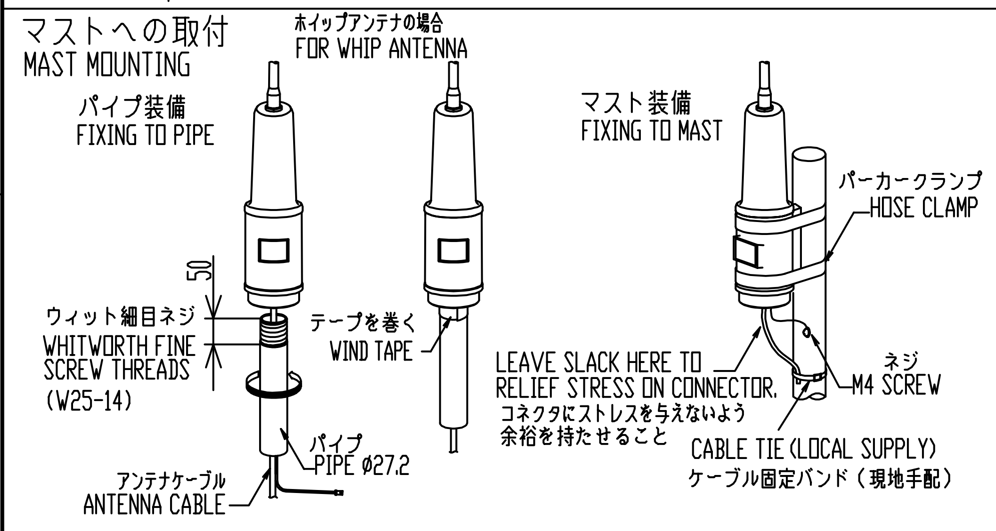
| 寸法範囲 (mm) DIMENSION | 公差(mm) TOLERANCE |
|---|---|
| L≦50 | ±1.5 |
| 50<L≦100 | ±2.5 |
| 100<L≦500 | ±3 |

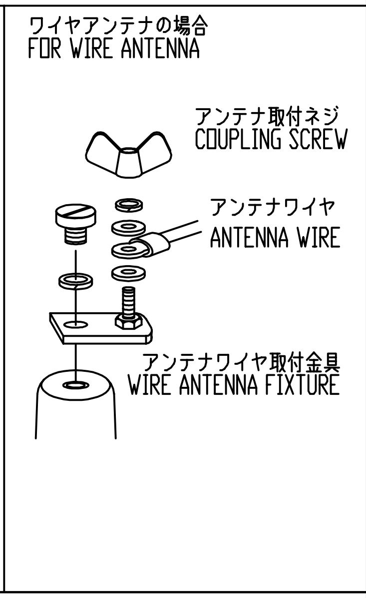



矢視 A
VIEW A
マスト装備時
FOR MAST INSTALLATION

注記 1. 指定外の寸法公差は表1を参照。

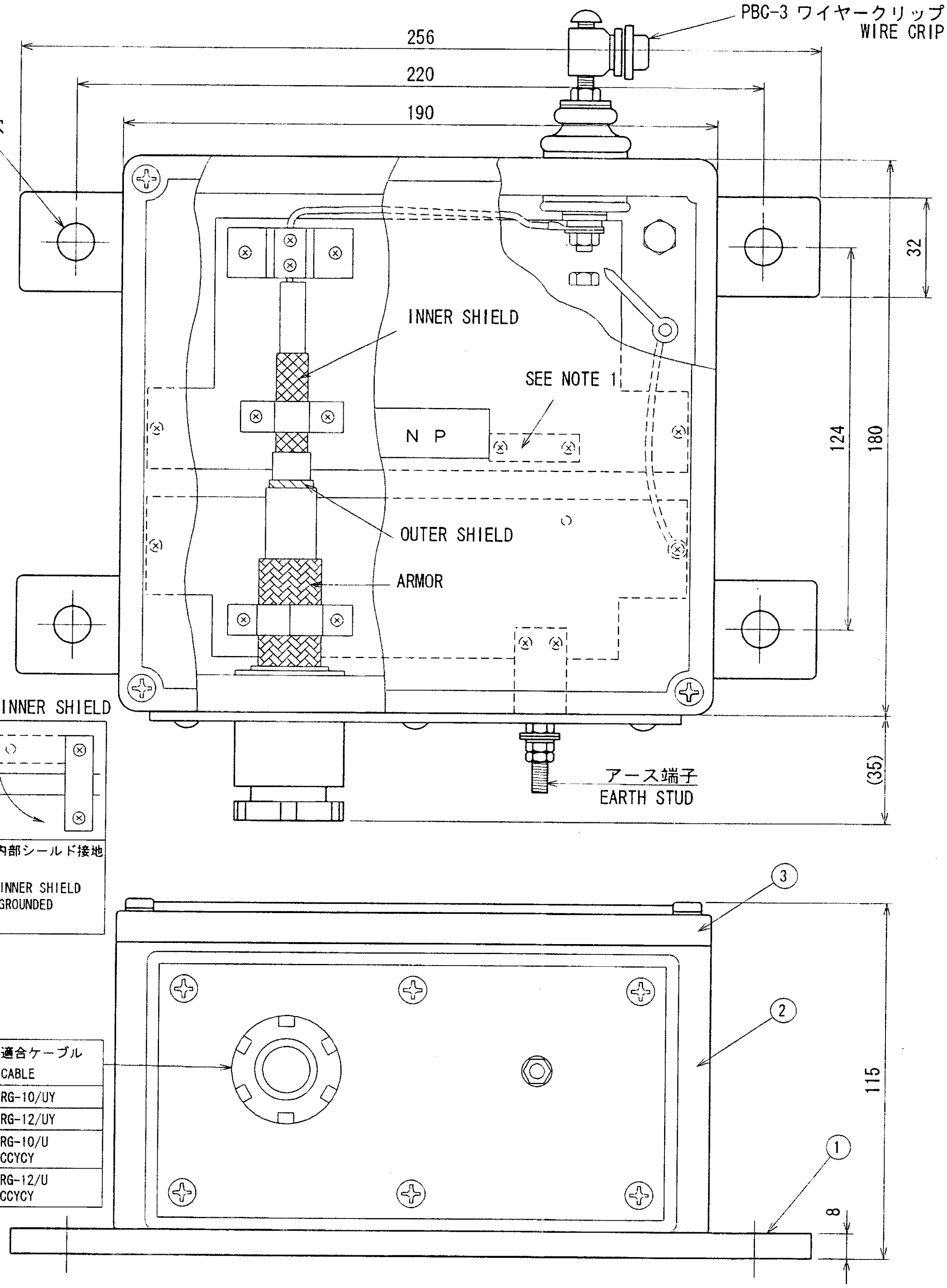
NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.



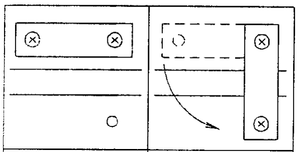




注記 装備前にパイプをプリアンプにねじ込むこと。
NOTE FASTEN PIPE TO ANTENNA BEFORE INSTALLATION.

| | | | |
|---|---|---|---|
| DRAWN | Jun. 2 '04 T.YAMASAKI | TITLE | FAX-5, NX-5/6 |
| CHECKED | Jun. 2 '04 T.TAKENO | 名称 | プリアンプ 外寸図 |
| APPROVED | Jun.14 '04 H.Hayashi | | |
| SCALE 1/2 | MASS 0.6 ±10% kg 質量はケーブルを含まず。 MASS W/O CABLE. | NAME | PRE-AMP UNIT OUTLINE DRAWING |
| DWG.No. | C6244-003- L | | |




NOTE 1
接続箱内の処理
CONNECTION OF INNER SHIELD



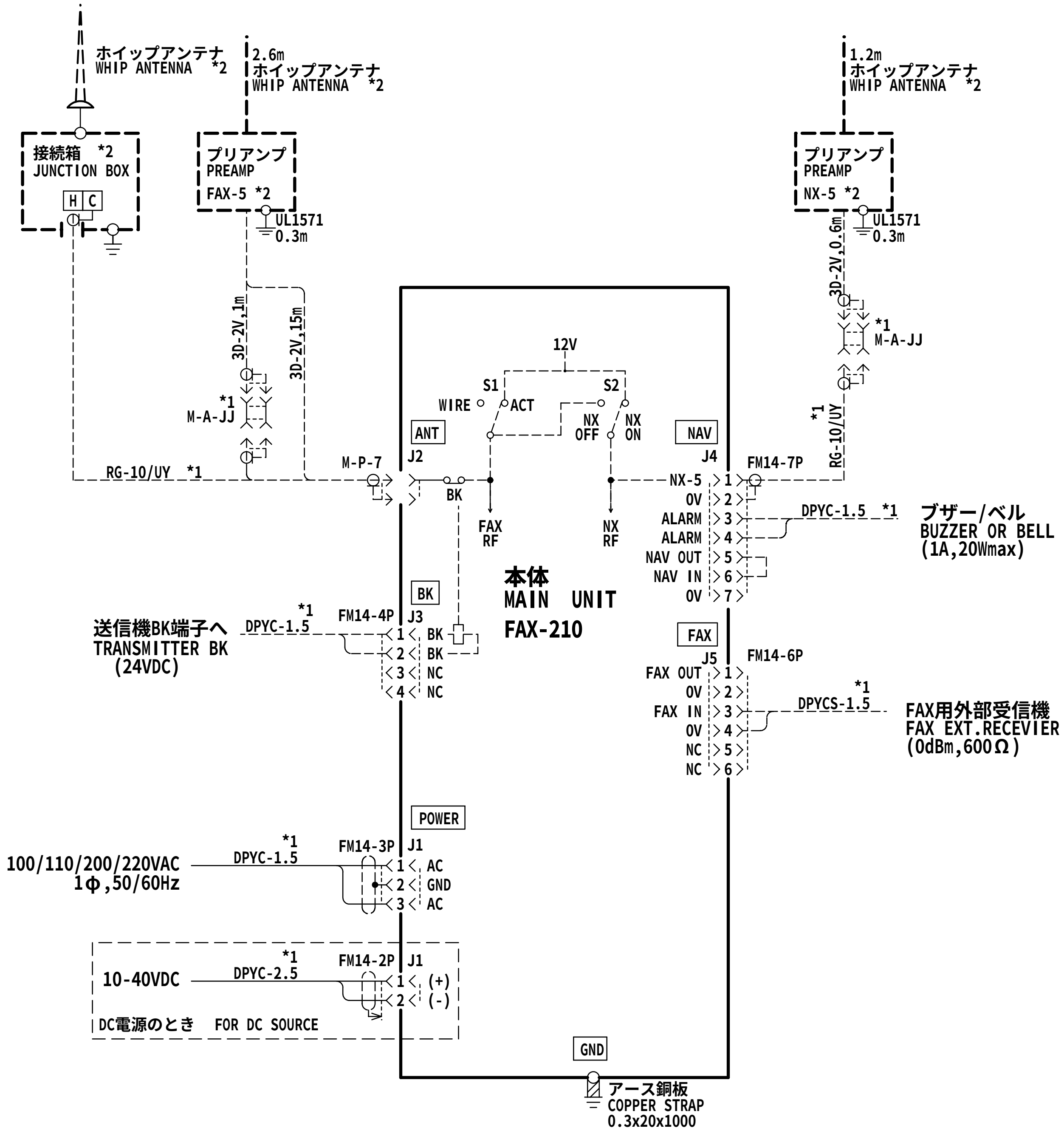
| 内部シールド 非接地（標準） INNER SHIELD NOT GROUNDED (STANDARD) | 内部シールド接地 INNER SHIELD GROUNDED |
|---|---|

| 型名 TYPE | グランド GLAND | 適合ケーブル CABLE |
|---|---|---|
| AJB1-1 [A] | A25a | RG-10/UY |
| | | RG-12/UY |
| AJB1-1 [C] | A25c | RG-10/U CCYCY |
| | | RG-12/U CCYCY |

| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG NO | 摘要 REMARKS |
|---|---|---|---|---|---|
| 3 | 蓋 LID | SUS304 | 1 | | |
| 2 | 筐体 CASE | FRP | 1 | | |
| 1 | 取付金具 BRACKET | SUS304 | 1 | | t=3 |

| | |
|---|---|
| DRAWN Oct 16 '00 T.YAMASAKI | TITLE AJB1-1A/B/C |
| CHECKED Oct 19 '00 T.K | 名称 受信空中線接続箱 外寸図 |
| APPROVED Oct 19 '00 T.K | |
| SCALE 1/2 / MASS 4 kg ±10% | NAME RECEIVING ANTENNA JUNCTION BOX OUTLINE DRAWING |
| DWG. No. C5017-046- G / 4-110770 | |

FURUNO ELECTRIC CO., LTD.




注記
＊1）造船所手配。
＊2）オプション。

NOTE
*1. SHIPYARD SUPPLY.
*2. OPTION.

| | | | | |
|---|---|---|---|---|
| DRAWN Aug. 3 '04 | T.YAMASAKI | | TITLE | FAX-210 |
| CHECKED Aug. 3 '04 | T.MATSUGUCHI | | 名称 | ファクシミリ受画装置 |
| APPROVED Aug.5 '04 | H.Hayashi | | | 相互結線図 |
| SCALE | MASS kg | | NAME | FACSIMILE RECEIVER |
| DWG.No. | C6249-C01- D | | | INTERCONNECTION DIAGRAM |

FURUNO ELECTRIC CO., LTD.

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan
Tel: +81 798-65-2111 Fax: +81 798-65-4200

Pub NO. DOC-315

# Declaration of Conformity CE 0560

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

Facsimile receiver model FAX-210
(Serial No. 2704-0001)

(Model name, serial number)

is in conformity with the essential requirements as described in the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment (R&TTE Directive) and satisfies all the technical regulations applicable to the product within this Directive

EN 60945: 1997-01 (IEC 60945 Third edition: 1996-11)

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- Statement of Opinion N° 01214014/AA/00 of 16 January 2001 issued by KTL Certification, The Netherlands
- Test report TI-1503 of 11 December 1995 prepared by Furuno Electric Co., Ltd.

On behalf of Furuno Electric Co., Ltd.

Hiroaki Komatsu
Manager,
International Rules and Regulations

(name and signature or equivalent marking of authorized person)

Nishinomiya City, Japan
January 23, 2001

(Place and date of issue)